The Meteoritical Bulletin, No. 102

ALEX RUZICKA[1], JEFFREY GROSSMAN[2], AUDREY BOUVIER[3], CHRISTOPHER D.K. HERD[4] and CARL B. AGEE[5]

[1]Cascadia Meteorite Laboratory, Department of Geology, Portland State University, Portland, Oregon, 97207-0751, USA
[2]NASA Headquarters, Mail Stop 3E46, 300 E Street, SW, Washington, D.C., 20546, USA
[3]Western University, Department of Earth Sciences, London, Ontario, N6A B57, Canada
[4]University of Alberta, Department of Earth and Atmospheric Sciences, Edmonton, Alberta, T6G 2E3, Canada
[5]Institute of Meteoritics, Department of Earth and Planetary Sciences, University of New Mexico, Albuquerque, New Mexico, 87131-0001, USA

Abstract: Meteoritical Bulletin 102 contains 3141 meteorites including 12 falls (Boumdeid (2003), Boumdeid (2011), Braunschweig, Chelyabinsk, Dongyang, Draveil, Heyetang, Indian Butte, Katol, Ladkee, Ouadangou, Xining), with 2611 Ordinary chondrites, 264 HED achondrites, 124 Carbonaceous chondrites, 30 Ureilites, 20 Martian meteorites, 16 Primitive achondrites, 16 Rumuruti chondrites, 15 Mesosiderites, 12 Iron meteorites, 10 Lunar meteorites, 9 Enstatite chondrites, 4 Enstatite achondrites, 4 Pallasites, 4 Ungrouped achondrites, and 2 Angrites, and with 1708 from Antarctica, 956 from Africa, 294 from South America, 126 from Asia, 47 from North America, 6 from Europe (including Russia), and 4 from Oceania. Information about approved meteorites can be obtained from the Meteoritical Bulletin Database (MBD) available on line at http://www.lpi.usra.edu/meteor/ .

A complete copy of this Bulletin (248 pages) is available electronically.

Table of Contents

The Meteoritical Bulletin was published on 19 AUG 2015 without the complete listing, it has been corrected.

1. *Information on dense collection areas*

Dense collection areas (DCAs) are specific regions on the surface of the Earth where place names are sparse and where numerous meteorite recoveries are made (Section 3.3c of the Guidelines on Meteorite Nomenclature). Naming of meteorites found in these areas is done using a generic prefix and a series of numbers; meteorites found in an area corresponding to an existing DCA are given a name that includes the next number in the sequence. The assignment of the next number in the sequence is done by the online submission system, i.e., at the time of submission of the meteorite classification file. Prefixes and their abbreviations are adjudicated and approved by the Nomenclature Committee to ensure that they convey geographic information and to avoid duplication of abbreviations. The committee maintains a complete list of approved DCAs, including abbreviations and maps in KML format (which can be read using Google Earth).

Most new DCAs are defined by submitters of meteorites found in areas requiring the establishment of a DCA. In order to streamline the process, the Nomenclature Committee created a DCA Coordinator position (held by Knut Metzler, 2013-present). In 2015 a DCA subcommittee was struck in order to establish DCAs in Morocco and surrounding areas following a change to the Guidelines that eliminates special rules for meteorites found in these areas. New DCA proposals should include all the information required for the Nomenclature Committee to adjudicate the request (maps, imagery and/or written descriptions outlining the geographic extent, etc.); however, the most frequently used, simplest method is to outline an area using Google Earth and submit the KML file to the DCA Coordinator (email: NomComDCA@gmail.com).

2. Alphabetical text entries for non-Antarctic meteorites

Agoudal 31°59.074'N, 5°30.917'W
Centre-South, Morocco
Found: 2000
Classification: Iron meteorite (IIAB)

History: (H. Chennaoui Aoudjehane, M. Aboulahris, *FSAC*) Two small pieces of iron were collected in 2000 in the Agoudal area, High Atlas Mountains, Morocco, and sold to tourists. In September 2011, one piece was sold to a dealer in Errich, who recognized it as an iron meteorite. During the last months of 2012, systematic searching by meteorite hunters with metal detectors resulted in the discovery of a large number of meteorites, mostly small. Many pieces were collected on the surface or buried a few cm deep. The largest piece recovered was 60 kg, buried ~50 cm below the surface. On 9 February 2013, H. Chennaoui Aoudjehane, M. Aoudjehane and M. Aboulahris collected 200 g of specimens; the listed coordinates are those of the largest piece they recovered. The strewnfield is not yet clearly defined.

Physical characteristics: Total mass is >100 kg. Hundreds of small pieces (1-100 g), many 100-1000 g, and a few pieces >1 kg, have been recovered. The majority of collected material occurs as 2-5 cm, irregularly shaped shrapnel pieces. Most pieces have a thin weathering rind. Some smaller bullet-shaped (~cm-sized) fragments are rounded, showing well-developed fusion crust.

Petrography: (L. Garvie, *ASU*) Decimeter-sized pieces show a coarse pattern of irregular, interlocking kamacite grains; some grains with sub-boundaries. Widmanstätten pattern not evident in the small sections studied. Grain boundaries commonly curved. Etched pieces range from shiny with well-developed Neumann bands, to pieces with a matte appearance, typical of the hatched ε-structure. The shock-hatched regions show incipient recrystallization, with secondary growth of irregularly-shaped (to 1 mm) kamacite. No plessite observed. Schreibersite abundant occurring as cm-sized skeletal crystals at the centers of kamacite crystals, as rhabdites, and as a grain boundary precipitate. Rhabdites locally numerous

as sharp, 10-25 μm faceted prisms. Scattered troilite nodules, to 1 cm. Troilite not surrounded by schreibersite, but instead large skeletal schreibersite is situated a few mm away. Heat-affected zone visible on some stones. Several of the smaller pieces, and especially the rounded bullet-shaped stones, have fusion crust and heated-affected zone of varying thickness; some completely recrystallized.
Geochemistry: (C. Herd and G. Chen, *UAb*): ICP-MS data, Ni 5.5 wt%, Co 4.1 mg/g, Ga 58 μg/g, Ir < 0.04 μg/g and Au ~ 1 μg/g.
Classification: Iron, IIAB. Structurally similar to Ainsworth.
Specimens: Type specimens include 2406 g, *ASU*; 17.5 g, *UAb*; 200 g, *FSAC*
Other names*:* This meteorite has been sold and traded under the name "Imilchil"

Ariah Park 34°18.92'S, 147°14.47'E
New South Wales, Australia
Found: 1932
Classification: Iron meteorite (IIIAB)
History: The meteorite was found in a dry creek bed by James Richard Keys in 1932, while he was walking with hunting dogs. It has been in possession of the Keys family since that date. It is named after a breached dam near Ariah Park, County Bland, Parish Mandamah, 44 km from S of West Wyalong, 35 km WNW of Temora, New South Wales.
Petrography: (A. Bevan, *WAM*). The meteorite is an octahedrite containing kamacite, taenite and large plessite fields. Kamacite bandwidth could not be determined accurately due to the small section examined. Kamacite is shock-hardened (ε-kamacite) and contains deformation bands. Kamacite contains abundant, small schreibersite crystals (rhabdites), platelets of carlsbergite, and rare daubréelite. Terrestrial oxidation has penetrated deeply along grain boundaries.
Geochemistry: (J.T. Wasson, *UCLA*): Ni = 77.4, Co = 4.97 (both mg/g), Cu = 167, Ga = 18.4, As = 3.86, Ir = 9.14, Au = 0.575 (all μg/g), W = 1.21 ng/g. Similar to Boxhole.
Classification: Iron, Group IIIAB medium to coarse octahedrite
Specimens: Type specimen, 24.8 g, *AMSA*. Main mass with the finder's son, Patrick James Keys.

Biduna Blowhole 004 31°1'58.0"S, 131°17'7.9"E
South Australia, Australia
Found: 6 Apr 2011
Classification: Ordinary chondrite (H5)
History: Single piece found by A. Tomkins on the Nullarbor Plain.
Physical characteristics: Unusually shaped 8 × 2.5 × 2 cm stone, dense, rounded edges, lacking fusion crust.
Petrography: (E. Mare, *Monash*) Sample contains few well-defined chondrules (largest is 2 mm) and recrystallized and rusted matrix. Chondrule types include CC, RP, POP, PP, BO. Fe-Ni metal grains (5%) are 250 μm on average. Troilite grains (3%) are 50-100 μm on average. Both metal and troilite have been partly replaced by oxides, however only to a limited extent, with ~5% oxides in this meteorite. Olivine grains show slightly undulose extinction and occasionally planar fractures. There is evidence of melt pockets where troilite and metal have flowed around silicate grains.
Geochemistry: (E. Mare, *Monash*) Microprobe analyses show that olivine and pyroxene compositions are uniform: olivine $Fa_{19.4\text{-}20.0}$, mean=$Fa_{19.6}$, std=0.3, n=4; Low-Ca pyroxene $Fs_{17.4\text{-}18.0}$, mean=$Fs_{17.5}$, std=0.3, n=4.
Classification: Ordinary chondrite (H5, S3, W2)

Bou Kra 004 26.707°N, 12.759°W
Saguia el Hamra, Western Sahara
Found: 2010 Sep 25
Classification: HED achondrite (Eucrite, monomict)

History: Found by Pjotr Muromov and Svend Buhl on September 25, 2010, on the G'idat Amwizirat plateau in Western Sahara (substrate is fine-grained limestone and chert desert pavement).
Physical characteristics: Two fresh, larger fragments (130.4 g and 93.80 g) coated by black fusion crust (and in turn by clusters of the fruticose lichen Ramalina maciformis), plus many small fragments weighing 17.0 g (>5 mm) and 31.5 g (<5 mm) total. All fragments were found within a 3.5 m radius, and fit together to form a heart-shaped and completely fusion-crusted mass.
Petrography: (A. Irving and S. Kuehner, *UWS*): Ophitic assemblage of exsolved pigeonite and calcic plagioclase with accessory silica polymorph, ilmenite, troilite, Ti-chromite and rare zircon. Pyroxenes contain dusty zones of microscopic troilite inclusions.
Geochemistry: Low-Ca pyroxene $Fs_{58.8}Wo_{5.6}$ (FeO/MnO = 29.8-30.7), high-Ca pyroxene $Fs_{28.3\text{-}28.5}Wo_{42.0\text{-}41.9}$ (FeO/MnO = 33.1-33.9).
Classification: Eucrite (unbrecciated, basaltic).
Specimens: 20.3 g of type material and one polished thin section are on deposit at *UWB*. Some of the remaining material was donated to the University of Casablanca, and the rest is held by *SBuhl*.

Bou Kra 005 26.819°N, 12.724°W
Saguia el Hamra, Western Sahara
Found: 2010 Sep 28
Classification: Carbonaceous chondrite (CM2)
History: Found by Marc Jost and Roger Perrinjaquet on September 28, 2010, on the Grart Nwimissiat plateau in Western Sahara (substrate is fine-grained limestone and chert desert pavement).
Physical characteristics: Two fresh pieces found 10 m apart (19.89 g and 11.25 g) of a black, fine-grained stone with some remnant degraded black fusion crust.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very small chondrules and mineral fragments (olivine, orthopyroxene, pigeonite, diopside and troilite), within an opaque to very dark-brown matrix containing phyllosilicates (cronstedtite) intergrown with tochilinite.
Geochemistry: Olivine $Fa_{0.3\text{-}52.6}$, orthopyroxene $Fs_{1.1\text{-}1.2}Wo_{2.9\text{-}4.9}$, pigeonite $Fs_{0.9\text{-}1.4}Wo_{32.0\text{-}34.7}$, diopside $Fs_{0.4}Wo_{46.5.}$
Classification: CM2 chondrite.
Specimens: A total of 6.34 g of type material and one polished thin section are on deposit at *UWB*. The remaining material is held by *SJS*.

Boumdeid (2003) 17°42.64'N, 11°22.29'W
Tagant, Mauritania
Fell: 24 Sept 2003
Classification: Ordinary chondrite (L6)
History: (R. Bartoschewitz, *Bart*) Mr. Isselmou ould Dah lived with his clan north of Gara Dekhene mountain, about 28 km north of Boumdeid. On Sept 24, 2003, between 9 and 10 p.m. he and surrounding nomadic people witnessed a fireball, and short time later a stone fell close to his tent. The stone was still warm when picked up. Later the complete individual of 190 g was broken in many fragments.
Physical characteristics: (R. Bartoschewitz, *Bart*) One completely crusted individual of 190 g. Magnetic susceptibility log $\chi = 4.69$ ($\chi \times 10^{-9}$ m^3/kg).
Petrography: (R. Bartoschewitz, *Bart*) Recrystallized matrix of olivine, Ca-poor pyroxene (0.1-0.5 mm) and secondary feldspar, with poorly developed barred olivine and porphyric pyroxene chondrules (~1 mm), chromite (0.1-0.5 mm), troilite, and metal.
Geochemistry: (R. Bartoschewitz, *Bart*; P. Appel and B. Mader, *Kiel*) Olivine $Fa_{24.5\text{-}25.1}$; pyroxene $Fs_{20.2\text{-}21.1}Wo_{1.1\text{-}1.9}$; feldspar $An_{10.1\text{-}15.7}Or_{4.9\text{-}11.0.}$ Kamacite Ni=4.4-6.6, Co=0.7-1.3 (all in wt.%). Radiochemistry: (D. Degering, Dresden) ^{22}Na=0.041, ^{26}Al=0.07 (in Bq/kg, date 2011 Nov) consistent with a 2003 fall date.
Classification: L chondrite (L6, S2, W0)
Specimens: ~90 g probably lost in Mauritania; type specimen, 20.1 g, *MKBraun*; 63 g, *Bart*.

Boumdeid (2011) 17°10.496'N, 11°20.480'W
Assaba, Mauritania
Fell: 14 Sept 2011
Classification: Ordinary chondrite (L6)
History: A bright bolide was observed descending from the SSW by many eyewitnesses in the departments of Gorgol and Assaba. South of Bou Mdeid an explosion was heard, causing panic among the local population. Witnesses reported a terminal fragmentation of the fireball, sonic booms and hissing sounds. One mass was observed to impact and recovered the following morning. Agence Nouakchott d'Information issued a report on the event, S. Buhl published eye witness accounts recorded by C. Toueirjenne.
Physical characteristics: The stone is light gray with a black fusion crust. Some chondrules are visible on broken surface, and some rusty spots.
Petrography: A brecciated texture is evident in thin section, all components being of type L6. Strongly recrystallized texture. Feldspar grain size to 100 μm. Opaque phases include kamacite, taenite, troilite, chromite, ilmenite, and rare native copper. A single Cr-Al-rich chondrule (1.0 mm) with plagioclase (An_{25}), spinel-chromite solid solution, ilmenite-geikielite and micron-sized baddeleyite is present in the analyzed thin section.
Geochemistry: Olivine has mean composition of $Fa_{23.9\pm0.5}$ (identical value confirmed by XRD), pyroxene $Fs_{20.2\pm0.4}Wo_{1.6\pm0.3}$. Cosmogenic radionuclides (M. Laubenstein, Laboratori Nazionali del Gran Sasso, Italy): Gamma-ray spectroscopy conducted 84 days after the fall showed the presence of short-lived isotopes (^{7}Be, ^{58}Co, ^{56}Co, ^{46}Sc), consistent with a recent fall. Data for ^{60}Co, ^{54}Mn and ^{22}Na indicate a pre-atmospheric radius of 10-20 cm.
Classification: Ordinary chondrite, L6 S2 W0.
Specimens: Type specimens: 53.6 g plus one polished thin section, *NMBE*; 807 g, *SBuhl*.

Braunschweig 52°13.548'N, 10°31.193'E
Niedersachsen, Germany
Fell: 2013 Apr 23, 02:05 a.m.
Classification: Ordinary chondrite (L6)
History: (R. Bartoschewitz, *Bart*) Erhard Seemann found a rock impacted into the concrete pavement in his yard 3 m from his front door on the morning of April 23, 2013. He documented his observation and collected the main fragments (~700 g) of the nearly complete fragmented stone. A neighbor heard a strong hum followed by a loud crash that night at about 2:10 a.m. In the morning he found several small rock fragments (~25 g) in his gateway. In Ahlum village, Julian Mascow was surprised by a bright flare coming from the SE, ending in a short tracer just over his head. About 90 s later he was startled by an explosion and ensuing rattling sound around him. Mark Vornhusen's web camera documented the fireball from Vechta. When Rainer Bartoschewitz documented the meteorite impact, he discovered many small fragments (~500 g) within 18 m of the others.
Physical characteristics: (R. Bartoschewitz, *Bart*) One meteorite of about 1.3 kg broken into hundreds of small fragments after impacting the concrete pavement. The biggest fragment, 214 g, stuck in the concrete making a 7-cm diameter by 3-cm deep depression. Other fragments were <30 g. The gray-white meteorite material is covered by a 0.4-mm thick dull black fusion crust with abundant 50 μm cracks. Magnetic susceptibility log $\chi = 4.75$.
Petrography: (R. Bartoschewitz, *Bart*) Recrystallized matrix of olivine, pyroxene (0.02-0.5 mm) and secondary feldspar hosting poorly developed and deformed, dominantly barred olivine chondrules (0.5 to 15 mm, av. 1.5 mm), metal, troilite and chromite. Dark metal-troilite veins (50 μm) cross the meteorite.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) olivine $Fa_{24.3\text{-}26.0}$ (mean $Fa_{25.2\pm0.40}$, n=33); Ca-poor pyroxene $Fs_{20.8\text{-}21.7}Wo_{1.0\text{-}1.8}$ (mean $Fs_{21.3\pm0.24}Wo_{1.6\pm0.20}$, n=12); Ca-rich pyroxene $Fs_{8.1\text{-}8.8}Wo_{44.4\text{-}45.2}$ (mean $Fs_{8.4\pm0.40}Wo_{44.7\pm0.35}$, n=4); feldspar $An_{11\text{-}18}Or_{4\text{-}10}$, chromite Cr/(Cr+Al)=88.3, Fe/(Fe+Mg)=79.8. Kamacite Ni=4.7-6.2, Co=1.0; taenite Ni=20-34, Co=0.3-0.7 (all in wt.%)
Classification: L chondrite (L6, S4, W0)

Specimens: 700 g, E. Seemann, Braunschweig, 570 g of which is on permanent loan to *SNMB*; type specimen of 25 g, *MKBraun*; 500 g, *Bart*

Buffalo Valley 40°25.318'N, 117°18.970'W
Lander County, Nevada, USA
Found: 2011 Dec 29
Classification: Ordinary chondrite (H5)
History: A solitary 21.5 g stone was found on a stranding-surface by the main-mass holder while he was leading a meteorite-recovery team on a reconnaissance of an alkali-flat.
Physical characteristics: Single orange-colored, round whole-stone with no fusion-crust; exterior extremely weathered but not the interior.
Petrography: (A. Rubin, *UCLA*) The rock contains diopside, but no polysynthetically twinned Low-Ca pyroxene grains.
Geochemistry: Low-Ca-pyx: $Fs_{15.8\pm0.2}\,Wo_{1.1\pm0.2}$ (n=9); Ca-pyx: $Fs_{5.8}\,Wo_{44.7}$ (n=1).
Classification: Ordinary Chondrite (H5), shock stage (S1), weathering grade (W2)
Specimens: 5.15 g type-specimen plus thin section on deposit at *UCLA*; *Verish* holds the main mass.

Burns 39°52'N, 106°53'W
Eagle County, Colorado, USA
Found: July 2003
Classification: Iron meteorite (IIIAB)
History: In July 2003, Gene Killinen was practicing with his new metal detector at his family's hunting cabin near Burns, Colorado. Gene found a strong signal in the area immediately in front of the cabin. He and his father excavated a mass from a depth of roughly 60-90 cm. They surmised that the large, heavy object might be a meteorite, but they were uncertain. A year later they took the object to Fort Lewis College, where a nickel test was performed, with positive results. A sample was sent to Randy Korotev, *WUSL*, who confirmed that the specimen was a meteorite and an octahedrite. Anne Black purchased the meteorite in September of 2006, and it was subsequently sold to Peter Utas at the Tucson Gem and Mineral Show in 2007.
Physical characteristics: The meteorite weighs approximately 18.4 kg and has a flattened, highly irregular shape, and craggy surface covered with a thin layer of oxide and caliche. Several phosphide and sulfide inclusions are visible on the surface.
Petrography: Bandwidth ~0.24±0.05 mm, thus Of. Recrystallized, 0.2 × 0.04 kamacite grains in many plessite fields, borders of kamacite bands are ragged, not straight. Schreibersite is present on centers of many bands, mostly reaching sizes of 0.2-0.5 long by 0.05-0.1 thick. One hieroglyphic schreibersite 2 mm thick by 16 mm long, is sandwiched by swathing kamacite bar that reaches a thickness of 6 mm. Several kamacite recrystallized with some tiny taenites (or schreibersites). Weathering moderate, but confined to surface and near surface. No FeS recognized. No heat altered zone.
Geochemistry: Composition: 5.69 mg/g Co, 103.7 mg/g Ni, 14.4 µg/g Ga, ~28 µg/g Ge, 23.4 µg/g As, 0.022 µg/g Ir, and 2.588 µg/g Au. Burns falls near the high-Au extreme of group IIIAB; it has the second highest Au and Ni, the third-highest As and the highest Co in the *UCLA* IIIAB data set. The Saint-Aubin meteorite has the highest Au, Ni and As contents. The other irons that are closely similar to these two are Tieraco Creek, Thurlow and Bella Roca.
Classification: IIIAB
Specimens: 80 g at *UCLA*.

Catalina 008 25°14'S, 69°43'W
Antofagasta, Chile
Found: 2011 Jul 3
Classification: Carbonaceous chondrite (CO3)
History: The meteorite was found by R. Martinez in the Atacama Desert.

Physical characteristics: A single partially crusted dark stone
Petrography: (J. Gattacceca, *CEREGE*) Abundant chondrules (40% vol), predominantly type I in a dark matrix (58% vol). Olivine in type I chondrules are zoned. CAIs up to 500 μm. Chondrule size ranges from a <100 μm up to 1 mm, with an average 190±120 μm (N=63).
Geochemistry: Olivine in the range Fa0.3-$Fa_{34.4}$ (mean $Fa_{19.1\pm13.5}$, PMD=65%, N=17). Low-Ca pyroxene $Fs_{2.9\pm1.0}Wo_{5.5\pm1.1.6.}$ Cr_2O_3 in ferroan olivine is 0.16±0.14 wt% (N=14). Magnetic susceptibility log χ = 4.05 (χ in 10^{-9} m^3/kg). Oxygen isotopic composition (J. Gattacceca, C. Sonzogni, *CEREGE*) is $\delta^{17}O$ = -6.55, $\delta^{18}O$ = -3.30, and $\Delta^{17}O$ = -4.84 per mil (analysis of one acid-washed 1.5 mg bulk sample).
Classification: Carbonaceous chondrite (CO3). Moderate weathering
Specimens: 20 g and one polished section are on deposit at *CEREGE*. Main mass, *MMC*.

Catalina 009 25°14'S, 69°43'W
Antofagasta, Chile
Found: 2012 Feb
Classification: Carbonaceous chondrite (CR2)
History: A single stone was found in the Atacama desert in February 2012 by Michael Warner.
Physical characteristics: A single rusty stone. Large chondrules up to mm are visible at the surface.
Petrography: (J. Gattacceca. *CEREGE*) Chondrule:matrix ratio is 3:2. Chondrules up to 2 mm (average diameter 1.1 mm) are often rimmed by metal. Most chondrules are type I, but a few type II chondrules were observed. Large metal blebs up to 700 μm in diameter are found in the chondrules and in the matrix.
Geochemistry: Olivine $Fa_{1.3\text{-}4.1}$, FeO/MnO=10.3, orthopyroxene $Fs_{2.4}Wo_{0.6}$, high-Ca pyroxene $Fs_{1.8}Wo_{39.0.}$ Some chondrules contain Plagioclase $An_{89.8}Ab_{10.0}Or_{0.2.}$ Magnetic susceptiblity log χ=4.86.
Classification: CR2. Moderate weathering
Specimens: 1 gr and a polished section at *CEREGE*. Main mass with Michael Warner.

Catalina 037 25.1°S, 69.75833°W
Antofagasta, Chile
Found: 5 Jul 2010
Classification: Ureilite
History: On 5 July 2010, while hunting for meteorites, Eric Christensen found more than 100 fragments within several meters of each other totaling 2219 g, the largest of which was 654 g. Exteriors of the fragments are pitted. Fusion crust is lacking.
Physical characteristics: Stone relatively easy to cut with a diamond blade. Interior is brownish green. Polished slices (4 × 3 cm) show uneven distribution of fine- to medium-grained areas (dominant) and medium- to coarse-grained regions, with crystals to ~1 cm.
Petrography: (L. Garvie, *ASU*) Two thin sections examined. First section dominated by fine- to medium-grained (to 1.5 × 0.6 mm) anhedral grains of olivine and pigeonite, with slight preferred orientation, and abundant 120° triple junctions. Second section dominated by large pigeonite pyroxene grains poikilitically enclosing smaller, rounded compositionally homogenous olivines. Pigeonite and olivine have similar compositional ranges in the two sections. Very low reduction level with thin (<50 μm) reduction rims. Graphite flakes (to 150 × 50 μm) present between olivine grains. Very little metal and terrestrial oxides present. Fairly abundant olivine-olivine grain-boundary veins (to 60 μm wide) consisting of feldspar surrounding euhedral augite crystals (to 50 μm). Low-Ca pyroxene (<20 μm) occurs within the feldspar adjacent to the graphite-rich regions.
Geochemistry: (L. Garvie, *ASU*) Olivine cores $Fa_{19.9\pm0.3}$, FeO/MnO=45.6±3.4, CaO up to 0.34 wt%, Cr_2O_3 up to 0.51 wt%, n=14. Reduced rims down to $Fa_{3.4.}$ Pigeonite $Fs_{16.6\pm0.2}Wo_{10.9\pm0.1}$, n=12. Olivine-olivine assemblage consisting of plagioclase feldspar host (two points analyzed $An_{47.6}Ab_{48.3}Or_{4.1}$, $An_{41.0}Ab_{48.7}Or_{10.3}$) enclosing euhedral low-Ca pyroxene ($Fs_{3.3\pm1.7}Wo_{5.0\pm0.5}$, n=3) and augite ($Fs_{2.1\pm0.7}Wo_{37.7\pm2.6}$, n=4).
Classification: Ureilite
Specimens: 83.5 g and two thin sections at *ASU*.

Catalina 079 ~25°14'S, ~69°43'W
Antofagasta, Chile
Found: 2010 Feb 9
Classification: Mesosiderite (group B)
History: The meteorite was found by R. Martinez in the Atacama desert among ordinary chondrite fragments. It was later identified as a different meteorite through magnetic susceptibility screening.
Physical characteristics: A single rusted stone of 4.4 g
Petrography: (J. Gattacceca, *CEREGE*) Silicates are mainly orthopyroxene with lesser plagioclase and Ca-pyroxene. Abundant metal in elongated grains up to 5 mm. Chromite, silica, troilite, merrillite are present. Modal abundances: pyroxene 49%, plagioclase 15%, FeNi metal 23%, metal weathering products 13%, troilite 1%, silica 1%.
Geochemistry: Orthopyroxene $Fs_{34.4\pm0.0}Wo_{3.3\pm0.1}$, FeO/MnO=24.0. Ca-pyroxene $Fs_{18.0\pm2.0}Wo_{36.8\pm5.2}$, FeO/MnO=21.1. Plagioclase $An_{89.8}Ab_{10.0}Or_{0.2.}$ Chromite Cr/(Cr+Al)=0.81. Magnetic susceptibility log χ = 5.56 (X in 10-9 m3/kg).
Classification: Mesosiderite (type B). Moderate weathering.
Specimens: 2 g and a polished section at *CEREGE*. 2 g at *MMC*.

Chelyabinsk 54°49'N, 61°07'E (approximate centroid)
Chelyabinskaya oblast', Russia
Fell: 15 Feb 2013; 3:22 UT
Classification: Ordinary chondrite (LL5)
History: At 9:22 a.m. (local time) on February 15, 2013, a bright fireball was seen by numerous residents in parts of the Kurgan, Tyumen, Ekaterinburg and Chelyabinsk districts. Images of the fireball were captured by many video cameras, especially in Chelyabinsk. Residents of the Chelyabinsk district heard the sound of a large explosion. The impact wave destroyed many windows in Chelyabinsk and surrounding cities. Many people were wounded by glass fragments. A part of the roof and a wall of a zinc plant and a stadium in Chelyabinsk were also damaged. Numerous (thousands) stones fell as a shower around Pervomaiskoe, Deputatsky and Yemanzhelinka villages ~40 km S of Chelyabinsk. The meteorite pieces were recovered and collected out of snow by local people immediately after the explosion. The snow cover was about 0.7 m deep. The falling stones formed holes surrounded by firm snow. Largest stones reached the frozen soil. A stone may have broken the ice of Chebarkul Lake, located 70 km W of Chelyabinsk. Small meteorite fragments were found around the 8 m hole in the ice but divers did not find any stones on the lake bottom.
Physical characteristics: The meteorite stones and fragments are from <1 g to 1.8 kg in weight and from a few mm to 10 cm (mainly 3-6 cm) in size. The total mass collected by local people is certainly >100 kg and perhaps > 500 kg. Fusion crusted stones are common. The fusion crust is black or brown and fresh. Broken fragments are rare. The interior of the stones is fresh but in some pieces there is evidence for weak oxidation of metal grains.
Petrography: (D.D. Badyukov and M.A. Nazarov, *Vernad*). The majority (2/3) of the stones are composed of a light-colored lithology with a typical chondritic texture. Chondrules (~63%) are readily delineated and set within a fragmental matrix. The mean chondrule diameter is 0.93 mm. The chondrule glass is devitrified. The main phases are olivine and orthopyroxene. Olivine shows mosaicism and planar fractures. Rare grains of augite and clinobronzite are present. Small and rare feldspar grains show undulatory extinction, planar deformation features, and are partly isotropic. Troilite (4 vol.%) and FeNi metal (1.3 vol.%) occur as irregularly shaped grains. Accessory minerals are chromite, ilmenite, and Cl-apatite. A significant portion (1/3) of the stones consist of a dark, fine-grained impact melt containing mineral and chondrule fragments. Feldspar is well developed and practically isotropic. No high-pressure phases were found in the impact melt. There are black-colored thin shock veins in both light and dark lithologies.

Geochemistry: (M.A. Nazarov, N.N. Kononkova, and I.V. Kubrakova, *Vernad*). Mineral chemistry: Olivine $Fa_{27.9\pm0.35}$, N=22; orthopyroxene $Fs_{22.8\pm0.8}Wo_{1.30\pm0.26}$, N=17; feldspar Ab_{86}; chromite Fe/Fe+Mg=0.90, Cr/Cr+Al=0.85 (at.%). Major element composition of the light lithology (XRF, ICP-AS, wt%): Si=18.3, Ti=0.053, Al=1.12, Cr=0.40, Fe=19.8, Mn=0.26, Ca=1.43, Na=0.74, K=0.11, P=0.10, Ni=1.06, Co=0.046, S=1.7. Atomic ratios of Zn/Mn × 100=1.3, Al/Mn=8.8. The impact melt lithology has almost the same composition but it is distinctly higher in Ni, Zn, Cu, Mo, Cd, W, Re, Pb, Bi (ICP-MS).
Classification: Ordinary chondrite (LL5), shock stage S4, weathering W0.
Specimens: About 400 stones weighing 3.5 kg in total and a few thin sections are in *Vernad*.

Chelyabinsk, *recovery of additional masses*

The main mass of the Chelyabinsk meteorite fell into Chebarkul lake and broke the ice, forming a 7 m hole (54°57'33.74"N, 60°19'19.58"E). Numerous small fragments (0.5 to 1 g) were scattered around the hole on the snowy ice. 5 kg of meteorite samples were recovered from the lake bottom using magnets during the first month after the meteorite fell. Additionally, ~10 kg of meteorite fragments were recovered by local residents in the same way, but were not well documented. Underwater recovery operations between Sept. 5 and Oct. 16, 2013, retrieved eight additional meteorite fragments: the largest sample weighed ~540 kg, and the other seven fragments totaled 84.4 kg. The total mass of meteorite pieces recovered from the bottom of Chebarkul lake was therefore ~640 kg. Hence the total estimated mass of Chelyabinsk meteorite fragments recovered from the lake and collected in the strewn field on land is ~1000 kg.

Submitted by A. V. Kocherov (Chelyabinsk State University, Chelyabinsk, Russia), M. A. Ivanova (*Vernad*).

Choteau
Montana, United States
Purchased: 2011
Classification: Pallasite (ungrouped)
History: Purchased in 2011 by Debbie Cilz at an estate sale in Choteau, Montana, and presumed to have been found locally by the deceased owner.
Physical characteristics: A single dense, brownish mass weighing 8474 g. Interior slices exhibit separated, angular clasts of olivine (~40 vol.%) within metal.
Petrography: (A. Irving and S. Kuehner, *UWS*) Composed predominantly of metal (kamacite with Ni-poor taenite) and large angular grains of olivine with accessory iron sulfide (pyrrhotite), schreibersite, merrillite, chromite and orthopyroxene. One large (4.5 mm) grain of exsolved calcic pyroxene was found (now composed of augite with orthopyroxene exsolution lamellae). Chromite and orthopyroxene occur in symplectitic intergrowths, and there also are small patches composed of chromite+iron sulfide+merrillite exhibiting triple grain junctions.
Geochemistry: Olivine ($Fa_{9.2\text{-}10.1}$; FeO/MnO = 27-35), orthopyroxene ($Fs_{11.2}Wo_{0.4}$; FeO/MnO = 23), host clinopyroxene ($Fs_{6.6}Wo_{44.3}$; FeO/MnO = 12), orthopyroxene exsolution lamella ($Fs_{15.3}Wo_{1.7}$; FeO/MnO = 18). Oxygen isotopes (K. Ziegler, *UNM*): analyses of acid-washed olivine by laser fluorination gave, respectively $\delta^{17}O$ = 0.152, 0.067; $\delta^{18}O$ = 2.502, 2.347; $\Delta^{17}O$ = -1.169, -1.172 (all per mil).
Classification: Pallasite, ungrouped. The oxygen isotopic composition is unlike those for any other pallasites, and falls on the broad trend for acapulcoites and lodranites.
Specimens: A 20.2 g polished slice is on deposit at *UWB*. 94.2 g at *ASU*, 158 g at *UNM*, 80 g at *TCU*, 81.9 g at *SI*. The main mass is held by *Boudreaux*; additional material is held by Mr. R. Garcia and Mr. R. Cucchiara.

Dar al Gani 1046 (DaG 1046) 27°24’10"N, 16°18’20"E
Al Jufrah, Libya
Found: 2005 Sep
Classification: HED achondrite (Eucrite, monomict)
Physical characteristics: Weathered brown stone.
Petrography: (C. Cordier and L. Folco, *MNA-SI*) Breccia consisting of lithic clasts set in a fine-grained clastic matrix. Clast size is up to 1 cm. Lithic clasts are dominated by basaltic eucrite. They are composed of exsolved pyroxene (pigeonite and minorly augite) and lath-shaped bytownite with sub-ophitic texture. Accessory phases include chromite, ilmenite, silica, zircon. Different clasts have variable grain size, ranging from 100 to 700 μm. Some of the smallest clasts consists of blocky low-Ca pyroxene showing compositional normal zoning.
Geochemistry: Bulk Fe/Mn = 30.4 by FPXRF. Mineral chemistry: Pigeonite $Fs_{55.5\pm3}Wo_{6.8\pm3.3}$ Fe/Mn=22.9±2.3 (n=16), augite $Fs_{25.9\pm0.2}$ $Wo_{41.0\pm0.1}$ Fe/Mn=25.4±4.2 (n=2), bytownite $An_{87.2\pm2.8}$ (n=6).
Classification: Polymict eucrite breccia

Dar al Gani 1062 (DaG 1062) 28°19’34"N, 15°31’52"E
Al Jufrah, Libya
Found: 2008 Nov
Classification: HED achondrite (Eucrite, polymict)
Physical characteristics: Weathered brown stone.
Petrography: Fine grained (50 to 500 μm) subophitic rock consisting mainly of exsolved pigeonite and bytownite plus accessory chromite, ilmenite and silica.
Geochemistry: Bulk Fe/Mn = 31.2 by FPXRF. Mineral chemistry: Pigeonite $Fs_{58.8\pm4.2}Wo_{9.8\pm6.0}$ Fe/Mn=24.9±2.9 (n=10), augite $Fs_{27.9\pm0.2}$ $Wo_{45.3\pm0.2}$ Fe/Mn=30.8±7.6 (n=2), bytownite $An_{88.0\pm2.2}$ (n=10).
Classification: Basaltic eucrite.

Dar al Gani 1063 (DaG 1063) 27°16.45’N, 16°24.50’E
Al Jufrah, Libya
Found: 2002 May 27
Classification: Carbonaceous chondrite (CV3)
History: Three almost unweathered stones with a fresh fusion crust having a total mass of 410.3 g were found May 27, 2002, by an anonymous finder in the desert of Dar al Gani.
Petrography: A chondrite with abundant matrix and large chondrules.
Geochemistry: Olivine, $Fa_{14\pm8}$ (range, $Fa_{1\text{-}30}$); pyroxene in chondrules and aggregates, $Fs_{3\pm3}$ (range, $Fs_{0\text{-}11}$). Olivine in the matrix has a composition of $Fa_{27\pm6.}$ Oxygen isotopes (A. Pack, *UGött*): $\delta^{18}O$ = -0.48, d17 O= -4.32, $\Delta^{17}O$ = -4.072 (all per mil).
Classification: The meteorite is a carbonaceous chondrite of the CV3 group. Based on the relatively high abundance of metal the meteorite must be grouped to the reduced subgroup.

Dhofar 1559 (Dho 1559) 18.733°N, 54.263°E
Zufar, Oman
Found: 2009 Apr 6
Classification: Ordinary chondrite (H6)
History: Found in the desert by an anonymous hunter on 6 April 2009.
Physical characteristics: A weathered mass (2466 g) consisting of a central fresher portion surrounded by more altered debris.
Petrography: Predominantly recrystallized texure with rare relict chondrules.
Geochemistry: (A. Irving and S. Kuehner, *UWB*) Olivine ($Fa_{18.6\text{-}18.8}$), orthopyroxene ($Fs_{16.4\text{-}16.6}Wo_{1.7\text{-}1.6}$), clinopyroxene ($Fs_{7.3\text{-}7.6}Wo_{43.6\text{-}44.2}$), sodic plagioclase, altered kamacite, taenite and troilite. Oxygen

isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples gave, respectively $\delta^{17}O$ = 3.052, 2.943; $\delta^{18}O$ = 4.717, 4.523; $\Delta^{17}O$ = 0.567, 0.561 per mil.
Classification: Ordinary chondrite (H6).
Specimens: 58.6 g of type material and one polished thin section are at *UWB*. The main mass is held by an anonymous collector.

Dhofar 1622 (Dho 1622) 18°26.713'N, 54°11.987'E
Zufar, Oman
Found: 2009 May 6
Classification: Carbonaceous chondrite (CO3)
History: Discoverd during a natural science expedition on May 6, 2009.
Physical characteristics: Single stone of 474 g, surface party covered by caliche, sawn face shows chondrules, set in fine-grained, brown matrix and lighter brown-colored clasts. Magnetic susceptibility log χ = 4.67.
Petrography: Microprobe examination of a polished thin section shows a variety of chondrules, CAIs, and AOIs up to 1 mm (mean 0.2 mm) set in a fine-grained matrix.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Olivine: $Fa_{0.5-49.5}$; mean 21.3; σ = 17.4, Cr_2O_3=0-0.12 wt%, Fe/Mn=90, σ=49 (n=53); low Ca pyroxene: $Fs_{0.9-19.2}$; mean 4.7; σ = 4.7 (n=18), $Wo_{0.2-4.7}$; mean 1.8; σ = 1.48; Ca-pyroxene $Fs_{1-16}En_{57-75}Wo_{42-9}$ (n=3); feldspar $An_{64}Or_2$ (n=1); kamacite: Ni=4.6-7.0, Co=1.2-0.5 (n=3); taenite: Ni=42.3, Co=0.3 wt.% (n=1); troilite.
Classification: Carbonaceous chondrite (CO3)
Specimens: 20.0 g on deposit at *Kiel*, main mass anonymous and 30 g with *Bart*.

Dhofar 1674 (Dho 1674) 18.317°N, 54.202°E
Zufar, Oman
Found: 2010 Nov 21
Classification: Martian meteorite (Shergottite)
History: Found by a prospector near the find site of Dhofar 019 and Dhofar 1668.
Physical characteristics: A single 49.2 g stone lacking fusion crust and with a thin brown weathering patina. The pale-brown interior is mostly fresh with small darker brown olivine grains in a groundmass containing sparkling maskelynite.
Petrography: (A. Irving and S. Kuehner, *UWS*) Small olivine phenocrysts are set in a groundmass of zoned clinopyroxene (predominantly low-Ca compositions) and intermediate plagioclase (maskelynite), with accessory ilmenite, chromite, pyrrhotite, merrillite and chlorapatite.
Geochemistry: Olivine ($Fa_{48.7-58.9}$; FeO/MnO = 47-55), pigeonite ($Fs_{25.0-34.5}Wo_{11.6-9.7}$; FeO/MnO = 30-34), subcalcic augite ($Fs_{18.8-21.2}Wo_{30.5-28.5}$; FeO/MnO = 23-24).
Classification: Martian (shergottite, olivine-phyric). Paired with Dhofar 019 and Dhofar 1668.
Specimens: A total of 9.98 g of material is on deposit at *UWB*. The main mass is held by an anonymous collector.

Dhofar 1734 (Dho 1734) 18°44.782'N, 54°11.548'E
Zufar, Oman
Found: 14 Jul 2001
Classification: Carbonaceous chondrite (CV3)
Petrography: Typical CV3 chondrite with large chondrules (~1 mm in apparent diameter). It also contains abundant fine–grained, olivine-rich aggregates embedded in an opaque matrix (30-40 vol%, estimated). Olivine in chondrules, fragments and aggregates in mostly Fa-poor (Fa_{1-6}); however, fine-grained matrix olivine is Fa-rich (56+-3 mol%). Based on the high Fa content of matrix olivine and the low metal abundance, the meteorite is likely a member of the oxidized CV3 subgroup.

Dhofar 1735 (Dho 1735) 18°44.383'N, 54°11.153'E

Zufar, Oman
Found: 14 Jul 2001
Classification: Ureilite

Petrography: Typical coarse-grained, olivine-rich ureilite. The olivine grains are surrounded by the typical dark to opaque reduction zones. The olivine cores are Fa_{19-21}, whereas within the reduced areas Fe contents down to Fa_2 have been analyzed. Most of the metal has been lost by terrestrial weathering.

Dhofar 1736 (Dho 1736) 18°43.685'N, 54°10.359'E
Zufar, Oman
Found: 18 Jul 2001
Classification: Ordinary chondrite (L3)

Petrography: Ordinary chondrite having some large fragments (accretionary breccias). The chondrules are surrounded by opaque, fine-grained matrix. Although the olivine and pyroxene within chondrules have low Fe contents, the chondrite is classified as an L3 chondrite based on the chondrules size (~500-700 μm), significantly larger than for H chondrites. Although the rock is severely weathered, it still has abundant metal indicating that the original metal content was higher than in LL chondrites.

Dhofar 1754 (Dho 1754) 19°23.58'N, 54°33.25'E
Zufar, Oman
Found: 2001 May 2
Classification: HED achondrite (Howardite)

History: A single fusion-crusted rock of 580 g was found near Dhofar 930 by an anonymous finder May 2, 2001.

Petrography: In thin section the rock has two distinct lithologies: one is basaltic and the other is diogenitic (each about 50 vol% in the section studied). Thus the rock is a breccia. The low-Ca pyroxene is variable in composition. Most are Fs_{22-34}; more Fs-rich olivine (~Fs_{45-60}) probably belongs to the eucritic lithology. Typical plagioclase has a composition of $An_{82-95.}$ The meteorite is a howardite.

Geochemistry: 42 randomly selected low-Ca pyroxenes were analyzed by SEM-EDS: The low-Ca pyroxene is variable in composition (~Fs_{22-60}) with mean Fe/Mn= 32.5. In the distribution a clear peak around Fs_{23-25} is found, which is typical for diogenites; more Fs-rich pyroxene (~Fs_{40-60}) probably belongs to the eucritic lithology. Plagioclase has a composition of $An_{82-95.}$

Classification: Pairing with Dhofar 930 (polymict eucrite) is unlikely because of the high abundance of Fs-poor ($Fs_{<30}$) low-Ca pyroxene within Dhofar 1754, which has not been reported from Dhofar 930.

Dhofar 1757 (Dho 1757) 18°43'23.3"N, 54°22'59.5"E
Zufar, Oman
Found: Jan 2011
Classification: Ordinary chondrite (H6)

Petrography: (G. Lucas, *UAb*) Chondrules mainly PO and POP. Opaque shock melt veins, irregular and planar fractures, mosaicism and undulatory extinction visible in the pyroxene and olivine.

Geochemistry: (C. Herd and G. Lucas, *UAb*). Olivine 19.8±0.7 (n=59); Low-Ca Pyroxene $Fs_{17.2\pm0.2}Wo_{1.3\pm0.2}$ (n=47).

Specimens: 21.1 g type specimen, including polished thin section, are on deposit at *UAb*. Main mass at *SQU*.

Dhofar 1758 (Dho 1758) 18°42'50.5"N, 54°20'53.5"E
Zufar, Oman
Found: Jan 2011
Classification: Ordinary chondrite (H4-6)

Petrography: (C. Hayes, *UAb*) Thin section reveals two distinct textures of different petrologic type: one with high matrix-chondrule ratio and another with well-defined chondrules. Variability in low-Ca pyroxene data obtained from the latter area suggests petrologic type 4. A type 4-6 breccia.
Geochemistry: (C. Herd and C. Hayes, *UAb*) Olivine $Fa_{19.0\pm0.8}$ (n=36); Low-Ca Pyroxene $Fs_{17.4\pm1.7}Wo_{1.3\pm0.5}$ (n=13). Olivine data was from both textural areas whereas low-Ca pyroxene data was obtained from the area with well-defined chondrules.
Classification: Ordinary chondrite (H4-6), breccia.
Specimens: 39.1 g type specimen on deposit at *UAb*. Main mass, including thin section, at *SQU*.

Dhofar 1759 (Dho 1759) 18°42'34.8"N, 54°08'56.6"E
Zufar, Oman
Found: Jan 2011
Classification: Ordinary chondrite (H4)
Petrography: (C. Hayes, *UAb*) Abundant, well-defined POP chondrules within a fine-grained matrix.
Geochemistry: (C. Herd and C. Hayes, *UAb*) Olivine $Fa_{18.3\pm0.4}$ (n=67); Low-Ca Pyroxene $Fs_{16.8\pm1.7}Wo_{1.4\pm0.3}$ (n=28).
Specimens: 38.5 g type specimen on deposit at *UAb*. Main mass, including thin section, at *SQU*.

Dhofar 1760 (Dho 1760) 18°36'37.3"N, 54°13'24.9"E
Zufar, Oman
Found: Jan 2011
Classification: Ordinary chondrite (H6)
Petrography: (G. Lucas, *UAb*) Chondrules display porphyritic olivine or pyroxene, barred olivine and cryptocrystalline textures. The presence of minor opaque shock melt veins, as well as irregular and planar fractures, and undulatory extinction in olivine and pyroxene indicates moderate shock (S3).
Geochemistry: (C. Herd and G. Lucas, *UAb*) Olivine 18.6±0.4 (n=47); Low-Ca Pyroxene $Fs_{16.6\pm0.5}Wo_{1.2\pm0.4}$ (n=54).
Specimens: 26.1 g type specimen on deposit at *UAb*. Main mass, including thin section, at *SQU*.

Dhofar 1766 (Dho 1766) 18.592°N, 54.271°E
Zufar, Oman
Found: 2011 Dec 9
Classification: Lunar meteorite (feldspathic breccia)
History: Found by a prospector in December 2011.
Physical characteristics: Angular 5 × 4 × 3 cm stone (292 g) with shiny, reddish exposure surface and bluish-grey basal surface. On surface ~5 mm rounded, knobby, yellowish-white to dark grey, partly melted clasts are embedded in a flow-textured groundmass, which has abundant, sub-mm vesicles.
Petrography: (A. Wittmann and P.Carpenter, *WUSL*) Melt rock with flow texture of aphanitic melt enclosing 5 to <0.5 mm size clasts of feldspar-rich rocks. All clasts are recrystallized but retain outlines of original textures of poikilitic to subhedral mafic silicates in plagioclase-dominated groundmass. Groundmass plagioclase forms dense masses of tabular, felty textured crystals with <10 μm skeletal pyroxene crystals filling interstices. Olivine occurs up to 50 μm, zoned, subhedral crystals in the melt groundmass, and in partly assimilated clasts is overgrown with augite that poikilitically encloses acicular plagioclase, silica-rich mesostasis and euhedral, up to 30 μm armalcolite crystals. Accessory troilite occurs in the melt groundmass as round to oval, <10 μm crystals, some of which are intergrown with minute taenite and tetratenite grains; subhedral to granular, 30 to 250 μm chromian spinel crystals exhibit variable ° of decomposition and recrystallization. Abundant vesicles are hollow or occupied by secondary gypsum, celestite, rare barite, and greenish-yellow, Mg-rich phyllosilicates (talc?) that are rimmed by celestite.
Geochemistry: (A. Wittmann, *WUSL*): Plagioclase ($An_{77-96}Ab_{13.9-3.4}Or_{0-0.7}$; N=21); olivine ($Fa_{10-30}$, molar Fe/Mn=61-195; N=20); augite ($Fs_{10-21}Wo_{24-42}$, molar Fe/Mn=34-40; N=3); armalcolite (up to 0.4 wt%

ZrO_2; n=6); spinel ($Mg_{3.65–4.84}Al_{6.48–12.77}Fe_{3.24–4.57}Ti_{0.37–0.65}Cr_{2.57–8.44}O_{32}$; n=3), troilite (up to 0.3 wt.% Ni; N=3), metal (36.5-45.5 wt% Ni, 1.3-1.4 wt% Co). Bulk composition (R. Korotev, *WUSL*) INAA of subsamples gave mean abundances of (in wt.%) FeO 2.9, Na_2O 0.69, CaO 16, (in ppm) Sc 4.6, La 1.2, Sm 0.58, Eu 1.6, Yb 0.36, Th 0.08, and 1.1 ppb Ir.
Classification: Lunar (feldspathic melt rock).
Specimens: 20.3 g of type material and one polished thin section are at *UWB*. The remaining material is held by the anonymous finder.

Dhofar 1767 (Dho 1767) 18.817°N, 54.766°E
Zufar, Oman
Found: 2013 Jan
Classification: HED achondrite (Howardite)
History: Found by a prospector in January 2013.
Petrography: (A. Wittmann, *WUSL*; A. Irving, *UWS*) Well-consolidated breccia composed of clasts (~1 mm in size) of orthopyroxene (~15 vol.%, of more than one composition based on BSE imaging), calcic plagioclase, exsolved pigeonite, unexsolved pigeonite, metal (as clasts up to 0.1 mm containing both taenite and kamacite), olivine, chromite, ilmenite, fayalite and silica polymorph. Celestite occurs in mm-long vein-like zones of and FeNi metal grains typically show oxidized rims.
Geochemistry: (S. Kuehner, *UWS*; A. Wittmann, *WUSL*): Diogenitic orthopyroxene ($Fs_{20.4-24}Wo_{1.4-3}$, FeO/MnO = 29-31), orthopyroxene ($Fs_{39.9}Wo_{3.8}$, FeO/MnO = 30), pigeonite ($Fs_{51.9}Wo_{7.3}$, FeO/MnO = 27), host orthopyroxene ($Fs_{61.8}Wo_{2.7}$, FeO/MnO = 32), clinopyroxene exsolution lamellae, $Fs_{27.3}Wo_{42.1}$, FeO/MnO = 32). olivine ($Fa_{57.5}$, FeO/MnO = 49; $Fa_{84.7}$, FeO/MnO = 42), plagioclase ($An_{90}Or_{0.4}$).
Classification: Howardite.
Specimens: 9 g including one polished thin section at *UWB*. The remaining material is held by the anonymous finder.

Diamond Valley 002 (DV 002) 39°57.318’N, 115°56.285’W
Eureka County, Nevada, United States
Found: 14 May 2011
Classification: Ordinary chondrite (H6)
History: A single stone was found by Mr. Richard Kimbell on the Diamond Lake bed north of Eureka, Nevada, on May 14, 2011. One piece of this stone was donated to *Cascadia* in July 2011.
Physical characteristics: The stone has a dark brownish-black exterior which represents a combination of weathered fusion crust and weathering rind, along with traces of a pink-colored caliche. The cut face is reddish-brown.
Petrography: (M. Hutson, *Cascadia*) Recrystallized texture with few discernible chondrules. Twinned feldspar is present. An abrupt contact between two recrystallized lithologies is visible. One of the two lithologies is more heavily weathered, with >= 95% of the opaques replaced by terrestrial weathering product. The majority of the thin section is composed of a less weathered lithology with ~60-70% replacement, indicative of a W3 weathering grade. Olivine grains are relatively deformed, with most having mosaic extinction and one or more planar fractures, indicating an S4 shock stage.
Geochemistry: Olivine ($Fa_{20.8±0.7}$, n=18) and low-Ca pyroxene ($Fs_{18.2±0.4}Wo_{1.5±0.2}$, n=22).
Specimens: A single mass of 16.2 g and 2 polished thin sections are on deposit at *Cascadia*. Mr. Richard Kimbell holds the main mass.

Diamond Valley 003 (DV 003) 39°56.087’N, 115°59.005’W
Eureka County, Nevada, United States
Found: 16 May 2011
Classification: Ordinary chondrite (H6)
History: A single stone found by Mr. Richard Kimbell on the Diamond Lake bed north of Eureka, Nevada, on May 16, 2011.

Physical characteristics: The stone has a dark brownish-black exterior which represents a combination of weathered fusion crust and weathering rind. Elaborate shock veins with entrained silicate clasts are visible on the brown-gray cut surface.
Petrography: (M. Hutson, *Cascadia*). Two thin sections are edged with fusion crust that grade into thick melt veins, which cut across and occupy most of the area of the section. The veins include partially weathered sulfide and only traces metal. Some areas between melt regions show discernible chondrules that are fairly integrated with their surroundings, but most regions appear granular with few readily discernible chondrules, suggestive of a type 6 chondrite. Olivine grains show strong mosaic extinction with multiple planar fractures and planar deformation features, and feldspathic areas are maskelynite, indicative of an S5 shock stage.
Geochemistry: Olivine ($Fa_{19.6\pm0.4}$, n=23) and low-Ca pyroxene ($Fs_{17.7\pm0.8}Wo_{1.4\pm0.2}$, n=18).
Specimens: A single mass of 21.0 g and 2 polished thin sections are on deposit at *Cascadia*. Mr. Richard Kimbell holds the main mass.

Domeyko 24°13’6.25"S, 69° 5’23.72"W
Antofagasta, Chile
Found: 2000
Classification: Iron meteorite (IIIAB)
History: A mass of 13880 g was found by Luc Labenne at Estación Zaldivar near la Mina Escondida while hunting for pallasites near the Imilac strewnfield.
Physical characteristics: The mass has the average dimension of 270 × 190 × 10 mm. The top is covered by pockmarks, with small wide pits and sharp ridges characteristic of sand-blasted Chilean irons. On the top a few large depressions indicate the location of troilite nodules. On the opposite side that was next to the ground the pockmarks are absent.
Petrography: Examined slab about 15 × 5 cm. Uniform Widmanstätten pattern with bandwidth 0.7 mm. Two FeS nodules (diameters 20 and 13 mm) and three long (26 to 31 mm) Brezina lamellae. Plessite is mainly fine, granular. Significant exterior weathering but interior relatively fresh; no heat-altered zone.
Geochemistry: (J.T. Wasson, *UCLA*) Composition: 5.53 mg/g Co, 94.8 mg/g Ni, 19.2 µg/g Ga, <50 µg/g Ge, 16.7 µg/g As, 0.057 µg/g Ir, and 1.848 µg/g Au. Based on the composition and structure, the iron belongs to group IIIAB. The nearest relatives of Domeyko are Hardesty (Ir = (0.088 µg/g) and Sanderson (Ir = 0.025 µg/g) but it is well resolved in Ir content from these.
Classification: Iron, IIIAB.

Dongyang 29.2753°N, 120.2363°E
Zhejiang, China
Fell: July 2002
Classification: Ordinary chondrite (H5)
History: During a night in July 2002, Mr. Xu Yiping heard an explosion. Several days later, he noticed that his roof was leaking and a black stone on the floor.
Physical characteristics: Single 230 g fusion-crusted, blocky stone, with chipped corners.
Petrography: Olivine, low-Ca pyroxene, kamacite, taenite and troilite are major phases. Minor phases include high-Ca pyroxene, plagioclase, chromite and apatite. Some chondrules with an indistinct edge can be recognized. Plagioclase grains range from 2 to 50 µm in size. Olivine was fractured; shock-induced veins, melt pockets and plagioclase-chromite assemblage are present in the matrix.
Geochemistry: The chemical compositions of olivine ($Fa_{18.4}$) and low-Ca pyroxene ($Fs_{16.3}$) are uniform.

Draveil 48°41.2’N, 2°25.7’E
Ile-del-France, France
Fell: 13 July 2011
Classification: Ordinary chondrite (H5)

History: A 206 g stone was found in a roof in Draveil on July 13, 2011, by N. and J.-P. Eydens and reported to P.-M. Pelé and A. Jambon (*UPVI*) a few days after the event. It was later discovered that a 5.2 kg stone had been seen to fall in a garden by a mailman in Savigny sur Orge at 12:30 am (local time) on that same day. Two more stones (88 g and 2 kg) made holes and dents in roofs in Draveil and Grigny, and a fifth one was later found by two schoolgirls in the park of the Rosa Parks high school in Montgeron. One was reported to have crashed through the windshield of a car in Draveil.
Physical characteristics: All stones are covered with a dull gray fusion crust except where they hit the ground or roofs. Most exhibit on their surface at least one rectangular cavity, partly filled with fusion crust as if a pool of liquid had flowed in the cavity.
Petrography: (A. Jambon, *UPVI*; R. Hewins, C. Fieni and B. Zanda, *MNHNP*; E. Dransart, *EMTT*). Equilibrated texture, relict chondrules, abundant metal.
Geochemistry: Olivine: $Fa_{18.7\pm0.3}$ (N=19); Low Calcium pyroxene $Fs_{16.7\pm0.6}$, $Wo_{1.3\pm0.8}$ (N=8) (EMP).
Classification: Ordinary chondrite (H5).
Specimens: Main mass: *MNHNP* (7338 g, 4 stones)

El Médano 096 24°51'S, 70°32'W
Antofagasta, Chile
Found: 2011 Oct 26
Classification: Primitive achondrite (Acapulcoite)
History: A single stone was found in the Atacama desert by Aurore Hutzler in October 2011.
Physical characteristics: A single 11 g brownish stone.
Petrography: (J. Gattacceca, *CEREGE*) The meteorite has an equigranular recrystallized texture with triple junctions. Typical grain size of olivine, pyroxene, and plagioclase is ~200 μm. Modal abundances: olivine + pyroxene 54%, plagioclase 10%, FeNi metal 12%, oxides (from weathering) 21%, troilite 2%, chromite 0.4%. Ca phosphate is present. Magnetic susceptibility log χ = 5.44 (c in 10^{-9} m^3/kg).
Geochemistry: Olivine $Fa_{11.6\pm0.2}$ (FeO/MnO=22.1), Orthopyroxene $Fs_{11.7\pm0.3}Wo_{3.2\pm0.3}$ (FeO/MnO=15.3), Plagioclase $An_{18.0\pm3.8}Ab_{79.2\pm3.3}Or_{2.8\pm0.5}$. Chromite Cr/(Cr+Al)= 0.85. Oxygen isotopes (C. Sonzogni, J. Gattacceca, *CEREGE*): analysis of a 1.5 mg acid-washed sample by laser fluorination gave $\delta^{17}O$ = 1.41, $\delta^{18}O$ = 4.30, $\Delta^{17}O$ = -0.82 (all per mil).
Classification: Acapulcoite. Weathering is moderate.
Specimens: 5 g and a polished section are on deposit at *CEREGE*. Main mass at Sernageomin.

El Médano 100 24°51'S, 70°32'W
Antofagasta, Chile
Found: 2011 Oct 24
Classification: Carbonaceous chondrite (C2, ungrouped)
History: The meteorite was found in the Atacama desert by Cécile Cournède in October 2011 during a systematic search for meteorites.
Physical characteristics: A single broken stone with fresh black fusion crust and light brown interior.
Petrography: (J. Gattacceca, *CEREGE*) Small chondrules (average 250 μm) and mineral fragments set in a phyllosilicate-rich matrix. Modal abundances: matrix 70%, chondrules and mineral fragments 23%, sulfides ~1 %. Rare kamacite. Powder x-ray diffraction shows an abundance of serpentine in the matrix.
Geochemistry: Olivine $Fa_{0.6\text{-}35.2}$ (mean 7.3±12.1, N=23), Cr_2O_3 in ferroan olivine is 0.39 wt.% (n=13), orthopyroxene $Fs_{0.9\text{-}8.1}Wo_{2.3\text{-}0.9}$ (mean $Fs_{3.7\pm2.8}$, mean $Wo_{0.9\pm0.1}$, N=7). Oxygen isotopic compositions: (J. Gattacceca and C. Sonzogni, *CEREGE*) analysis of a 1.5 mg acid-washed sample by laser fluorination gave $\delta^{17}O$ = -10.29; $\delta^{18}O$ = -7.59; $\Delta^{17}O$ = -6.35 (all per mil). Mag susceptibilty log χ =3.93 (χ in 10^{-9} m^3/kg).
Classification: Carbonaceous chondrite (C2-ung); moderate weathering.
Specimens: 1 gram and a polished section are on deposit at *CEREGE*. A polished section is at *MNHN*.

El Médano 195 ~24°51'S, ~70°32'W

Antofagasta, Chile
Found: 2011 Oct 23
Classification: Ordinary chondrite (H/L3)
Petrography: Fa PMD=29%, Fs PMD=23%. Cr_2O_3 in ferroan olivine is 0.11±0.17 wt.% (N=13). Mean chondrule apparent diameter 413±245 μm (N=70) is too small for a L chondrite, and magnetic susceptibility logc=4.99 is too low for a H W1 (but identical to Tieschitz at 4.97 and Bremervörde at 4.99), hence the H/L classification. Estimated sub-type of 3.4 based on PMD FeO in olivine and texture.

El Médano 200 ~24°51'S, ~70°32'W
Antofagasta, Chile
Found: 2011 Oct 29
Classification: C3
History: A single stone was found in the Atacama desert by Pierre Rochette in October 2011.
Physical characteristics: A single 2.4 g stone with fusion crust. The interior is uniformly dark and porous.
Petrography: (J. Gattacceca, *CEREGE*) The meteorite consists of small chondrules (mostly type I, often with a fine-grained dark rim), chondrule fragments, mineral fragments (up to one mm) in a fine-grained matrix. Modal abundances: matrix 55%, chondrules and mineral fragments 45%. Chondrule mean size is 130±80 μm (N=41). Some chondrules show Fe diffusion rims in the olivine (~2 μm thick). Presence of dusty olivine. Abundant assemblages of magnetite and sulfides (troilite) up to 100 μm. Rare metal. Based on magnetic measurements, magnetite content is estimated to ~19 wt.% under the form of fine grains in the matrix. Powder XRD pattern lacks phyllosilicate reflections. Raman spectra of the matrix (L. Bonal, *IPAG*) suggest minimal thermal metamorphism. IR spectra of the matrix (L. Bonal, *IPAG*) suggest some aqueous alteration and the presence of carbonates.
Geochemistry: Olivine $Fa_{0.3\text{-}69.5}$ (mean 22.7±23.6, PMD Fa = 94%, N=39). Cr_2O_3 in ferroan olivine is 0.36±0.24 wt.% (N=30). Orthopyroxene $Fs_{1.6\pm0.5}Wo_{0.7\pm0.4}$ (N=7). Ca-rich pyroxene $Fs_{1.5\text{-}17.4}Wo_{42.3\text{-}28.1}$ (N=3). Three metal analyses give Fe46.5±3.5Ni53.5±2.3 indicating Ni-rich taenite or tetrataenite. Oxygen isotopic compositions: (J. Gattacceca and C. Sonzogni, *CEREGE*) analysis of a 1.5 mg acid-washed sample by laser fluorination gave $\delta^{17}O$ = -5.15, $\delta^{18}O$ = -1.74, $\Delta^{17}O$ = -4.25 (all per mil). Mag susceptibility log χ =5.08 (χ in 10^{-9} m^3/kg).
Classification: C3 with affinities to CO3.
Specimens: One gram and a polished section at *CEREGE*. Main mass with *CEREGE*.

El Médano 209 ~24°51'S, ~70°32'W
Antofagasta, Chile
Found: 2011 Oct 24
Classification: Carbonaceous chondrite (CO3)
History: A single dark stone was found in the Atacama desert by Cécile Cournède in October 2011.
Petrography: (J. Gattacceca, *CEREGE*) Abundant chondrules, predominantly of type I in a dark matrix. Chondrule:matrix ratio is ~1:1. Olivine in type I chondrules is zoned. Chondrule size ranges from <100 μm to 500 μm, with an average 224±82 μm (N=31).
Geochemistry: Olivine in the range $Fa_{0.4\text{-}36.9}$ (mean $Fa_{7.5\pm12.0}$, PMD=112%, N=14). Low-Ca pyroxene $Fs_{7.5\pm4.4}Wo_{2.4\pm1.3}$ (N=6). Cr_2O_3 in ferroan olivine is 0.15±0.26 wt% (N=8). Magnetic susceptibility log χ = 4.36 (c in 10-9 m3/kg).
Classification: Carbonaceous chondrite (CO3). Strong weathering.
Specimens: Type specimen (4 g) and main mass at *CEREGE*.

El-Shaikh Fadl 005 (ESF 005) 28°14.96'N, 31°15.09'E
Al Bahr al Ahmar, Egypt
Found: Apr 2010
Classification: Ordinary chondrite (L, melt rock)

Petrography: (C. A. Lorenz, *Vernad*) The meteorite is fine to medium grained and lacking recognizable chondrules. The rock is composed of 50-100-μm-sized euhedral to subhedral grains of olivine and pyroxene and interstitial aggregate of feldspar (or feldspathic glass) and fine-grained (~20 μm) olivine and pyroxene. Accessory chromite. The rock has ~5 vol% of empty vugs. Iron Fe oxyhydroxides occur as 10-50-μm-sized irregular-shaped inclusions, scattered through the rock.

DISCOVERY OF *FERINTOSH STONY* METEORITE, CANADA
Name: *FERINTOSH.*
The place of fall or discovery: 3 kilometres northwest of the village of Ferintosh, Alberta, Canada: φ = 52°48' N; λ = 112°59'W.
Date of fall or discovery: FOUND, October, 1965.
Class and type: *STONY, Chondrite*
Number of individual specimens: One (another is believed to have been picked up some years ago and later to have been lost).
Total weight: 2201 grams.
Circumstances of the fall or discovery: The meteorite was picked up by D. A. Enarson and I. S. Enarson on the farm of the latter during harvesting operations. It appeared to be an unusual type of rock and was brought in to the Department of Geology at the University of Alberta, Edmonton, by D. A. Enarson, a student at this University. The meteorite has very well developed regmaglypts. It may have come from a bright bolide reported in this area in the early 1930's. The sharply angular surfaces of the specimen suggest it may have been part of a shower. The specimen has been acquired for the University of Alberta collection (Edmonton).
Source: Report of Prof. R. E. Folinsbee (Edmonton, Canada) in a letter, XI. 18 1965.

*New information and classification of **Ferintosh**:*

Geochemistry: Olivine $Fa_{25.7}$ (range $Fa_{25.1\text{-}26.7}$); Low-Ca Pyroxene $Fs_{22.1}$ (range $Fs_{21.2\text{-}24.3}$), after Smith (1997).
Classification: Ordinary chondrite (L6).
Specimens: 2.168 kg specimen and polished microprobe mount at *UAb*.

Gresia 44°10.28'N, 24°55.13'E
Teleorman, Romania
Found: 1990
Classification: Ordinary chondrite (H4)
History: Unearthed from the garden of a private (main mass owner's) property. Exterior weathered with cracking throughout.
Physical characteristics: Interior gray and in places heavily stained.
Petrography: Most chondrules well defined, mesostatis dominated by turbid, devitrified material, presence (10-20%) of typically twinned cpx. In places all pyroxene grains within chondrules are clinopyroxene. Secondary feldspar grains rare and to 10 μm.
Specimens: A total of 451.1 g (including 1 large slice and several smaller fragments) and two thin sections (one covered) are deposited at *NHMV*. F. Pereteanu holds the main mass.

Grove Mountains 090312 (GRV 090312) 72°56'4.2"S, 75°19'1.3"E
Antarctica
Found: 2010 Jan 14
Classification: Ureilite
History: One of 1618 meteorite samples collected by CHINARE in the Grove Mountains, East Antarctica, during the 2009-2010 field season.

Physical characteristics (B. Miao, H. Chen, Z. Xia, L. Xie, J. Yao, *GUT*): A 13.3 g stone has a roundish shape, 3.1x2.2x2.0 cm in size. Its part surface is covered by black fusion crust.
Petrography (B. Miao, H. Chen, Z. Xia, L. Xie, J. Yao, *GUT*): It consists of coarse-grained olivine, pigeonite and carbon polymorphs. And it shows a typical ureilitic texture, including triple junctions among olivine and pigeonite, microns diamond grains, and reduced zonation of olivine.
Geochemistry (B. Miao, H. Chen, Z. Xia, L. Xie, J. Yao, *GUT*): Olivine, $Fa_{22.0\pm0.4}$ (n = 12), Cr_2O_3 0.56 - 1.66 wt%, CaO 0.18 - 0.25 wt%; pigeonite, $Fs_{19.7\pm0.4}Wo_{4.3\pm1.1}$ (n = 13), Cr_2O_3 1.14 - 2.41 wt%.
Classification: Ureilite (monomict)
Specimens: The main mass and one thin section are on deposited at *PRIC*.

Grove Mountains 090994 (GRV 090994) 72°59'5.6"S, 75°14'55.2"E
Antarctica
Found: 2010 Feb 1
Classification: Mesosiderite
History: One of 1618 meteorite samples collected by CHINARE in the Grove Mountains, East Antarctica, during the 2009-2010 field season.
Physical characteristics (B. Miao, H. Chen, Z. Xia, L. Xie, J. Yao, *GUT*): The 369.1 g stone has an irregular shape. It contains an even distribution of metal and silicates portions. It has no fusion crust.
Petrography (B. Miao, H. Chen, Z. Xia, L. Xie, J. Yao, *GUT*): It consists of 35 vol% of metallic Fe-Ni and the silicate portion. The silicate part consists of various large fragments of pyroxenes, plagioclase.
Geochemistry (B. Miao, H. Chen, Z. Xia, L. Xie, J. Yao, *GUT*): Kamacite, Ni 4.71 - 6.22 wt%; Taenite, Ni 36.2 - 46.1 wt%. The metal has no detectable Co. Orthopyroxene, $Fs_{27-33}Wo_{2-5}$, FeO/MnO (in weight) = 21.
Classification: Mesosiderite, significantly weathered.
Specimens: The main mass and one thin section are on deposited at *PRIC*.

Heyetang 27°14' 48.73" N, 111°19' 18.72" E
Hunan, China
Fell: late October 1998
Classification: Ordinary chondrite (L3)
History: In late October, 1998, Mr. Wen and his friends heard a loud shrill sound and saw a fireball and subsequent landing of a meteorite about 200 m away. The meteorite embedded itself in a recently harvested rice field. The stone was said to be hot after being dug from the hole. It was bought by *IGGCAS* in August, 2012.
Physical characteristics: The 2.5 kg meteorite is an almost complete rounded stone covered by black fusion crust. Small light gray-colored chondrules set in matrix are evident. Rust spots on the surface.
Petrography: (G. Wang *GIGCAS*. W. Shen and S. Hu, *IGGCAS*). Chodrules 100-1500 μm in diameter, average ~300 μm. The chondrules/matrix ratio is about 5. The abundance of metal and sulfide is about 5 vol%.
Geochemistry: (G. Wang, X. Jiang and D. Wang, *GIGCAS*; W. Shen, S. Hu and Y. Lin, *IGGCAS*). Olivine, $Fa_{6.69-33.5}$, low Ca-pyroxene, $Fs_{1.70-40.3}Wo_{0.09-5.71.}$ Opaque minerals dominated by sulfide, kamacite, and taenite with minor limonite. The average content of Co is 7.1 mg/g in kamacite.
Classification: Ordinary chondrite, L3, S2, W1.
Specimens: Most of the sample is on deposit at *IGGCAS*. About 90 g of sample is on deposit at *GIGCAS*.

Indian Butte 32°51.860'N, 112°2.920'W
Pinal County, Arizona, USA
Fell: 7 June 1998
Classification: Ordinary chondrite (H5)
History: The following lines of evidence support a connection between the Indian Butte stones and the "Casa Grande" fireball of 7 June 1998: 1) The discovery location is consistent with the triangulated

endpoint based on fireball reports; 2) The location is directly under a Doppler radar return; 3) The stones are fresh (weathering grade W0 to 1). Doppler radar was first used in 2009 to locate the Ash Creek meteorite fall. The Indian Butte radar signal was recently identified during a search of historic falls. Some stones have been marketed under the synonym "Stanfield". A 128 gram stone was discovered by Robert Reisener, Sonny Clary, and Fredric Stephan while investigating a doppler radar signal corresponding to the "Casa Grande" fireball of 7 June 1998. At least 30 other stones were subsequently found. The Doppler signature was identified by Marc Fries and Robert Matson using fireball witness reports collected by Robert Ward. The location of discovery is near the area searched by David Kring and others immediately after the fireball.
Physical characteristics: At least 30 fusion-crusted stones have been recovered, with a total mass of 1721 grams. The fusion crust is fresh, although many stones display slight oxidation on the bottom where they lay on the desert surface. The interior metal is free of limonite rinds, indicative of weathering grade W0.
Petrography: (A.Rubin, *UCLA*) The chondrite is moderately recrystallized. Polysynthetically twinned low-Ca pyroxene is absent. A few small grains of diopside have grown large enough to be analyzed with the electron microprobe. Plagioclase has also grown fairly coarse; grains up to 25 μm across are present.
Geochemistry: Olivine, $Fa_{17.9\pm0.3}$; pyroxene, $Fs_{16.0\pm0.2}Wo_{1.5\pm0.2.}$ Mineralogical equilibrium has occurred.
Classification: Ordinary chondrite (H5). Shock stage = S1 and weathering grade = W0.
Specimens: Most stones are privately held; 22.2 grams have been deposited at *UCLA*.

Jbilet Winselwan 26°40.044'N, 11°40.637'W
Morocco/Western Sahara
Found: 24 May 2013
Classification: Carbonaceous chondrite (CM2)
History: (H. Chennaoui Aoudjehane, M. Aoudjehane, A. Laroussi, A. Bouferra) In early June 2013, A. Bouferra, a meteorite hunter from Smara, reported a new carbonaceous chondrite that had been found close to Smara. Due to its proximity to Smara (7 km), many meteorite hunters visited the area in the summer of 2013.
Physical characteristics: Total mass is estimated about 6 kg, with small and complete pieces between 3 and 10 g, a few medium-sized pieces 10 to 200 g and rare big pieces >200 g. The largest sample is ~900 g. Fresh looking fusion is crust present on many fragments. Some fragments are wind ablated. Some cracks contain secondary, crystalline alteration products. Interior of stones is black and peppered with chondrules.
Petrography: (R. Hewins, *MNHNP*, L Garvie, *ASU*). The meteorite contains chondrules and fragments of Types I and II. These include BO-PO, formerly metal-rich, and olivine-pyroxene Type I chondrules. Type II chondrules with forsterite relict grains are present. There are regions packed with chondrule material and coarse PCP, and zones with scattered chondrule material in fine-grained matrix. Chondrule sizes range up to 1.2 mm, though most are around 200 μm. A few CAIs are 800 μm. Powder x-ray diffraction shows a strong 0.7 nm peak for serpentines, a broad but weaker peak around 1.3 nm corresponding to smectites, and a weak broad peak consistent with tochilinite.
Geochemistry: (R. Hewins, *MNHNP*) Olivine is $Fa_{0.98\pm0.44}$ and $Fa_{25\text{-}40.}$ Pyroxene is $Fs_{2.6\pm1.5}$ and $Fs_{40\text{-}61.}$ Rare kamacite with 5.8 wt% Ni is present. (P. Cartigny, *IPGP*) The oxygen isotopic compositions of two pieces were determined as $\delta^{18}O$ 3.811±0.09 and 5.851±0.016, $\delta^{17}O$ -2.446±0.040 and -0.601±0.026, respectively. $\Delta^{17}O$ values are -4.441 and -3.663, mean -4.052.
Classification: The oxygen isotope compositions, petrography and mineral compositions are all consistent with CM2
Specimens: 17.8 g *MNHNP*, 17.4 g *FSAC* provided by L. *Labenne*, 20 g *UNM* provided by G. Fujihara, 122 g *ASU* provided by *Farmer*. Other collection masses include: *Farmer* 2.6 kg, *Labenne* 1.6 kg, T. Jakobowski 512 g, G. Fujihara 358 g, M. Ouzillou 173 g.

Jiddat al Harasis 567 (JaH 567) 19° 22' 34" N, 55° 15' 53" E

Zufar, Oman
Found: 2009 Mar 6
Classification: Ordinary chondrite (H3.6)

Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, small (<0.5 mm) chondrules. Minerals are olivine, orthopyroxene, pigeonite, sodic plagioclase, altered kamacite, taenite, troilite.
Geochemistry: Olivine ($Fa_{0.5\text{-}51.5}$; Cr_2O_3 in ferroan olivine 0.02-0.06 wt.%, mean 0.04, s.d 0.03, N = 7), orthopyroxene ($Fs_{3.7\text{-}17.8}Wo_{0.3\text{-}0.8}$), pigeonite ($Fs_{26.1}Wo_{11.6}$). Oxygen isotopes (D. Rumble, *CIW*): Analyses of acid-washed subsamples by laser fluorination gave $\delta^{18}O$ 5.27, 5.83; $\delta^{17}O$ 3.45, 3.80; $\Delta^{17}O$ 0.675, 0.736 per mil.
Classification: Ordinary chondrite (H3.6). Subtype estimated to be 3.6 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Jiddat al Harasis 798 (JaH 798) 19°58.50'N, 56°25.467'E
Al Wusta, Oman
Found: 2001 Apr 15
Classification: Mesosiderite

History: One fusion crusted stone of 16.6 g was found by an anonymous finder, April 15, 2001.
Physical characteristics: The rock is heavily weathered and was originally metal rich.
Petrography: The rock is brecciated and consists of abundant pyroxene-rich clasts. The low-Ca pyroxene has a composition of $Fs_{30\pm1}$. Some grains of phosphate and plagioclase ($\sim An_{95}$) were also found.
Classification: The meteorite is a mesosiderite and probably paired with Jiddat al Harasis 203 and the many other mesosiderites from the same area.

Jiddat al Harasis 800 (JaH 800) 19°52.955'N, 56°39.780'E
Al Wusta, Oman
Found: 2011 Jan 22
Classification: Ureilite

History: Four fragments with a combined mass of 1299.3 g were found during a search for meteorites by D. Abplanalp, U. Eggenberger, N. Federspiel, E. Gnos, B. Hofmann.
Physical characteristics: Dark brown rock, strongly wind-eroded, no fusion crust.
Petrography: (B. Hofmann, *NMBE*; E. Gnos, *MHNGE*; N. Greber, *Bern*): The rock shows an equigranular texture with a grainsize of 0.8-1.8 mm and consists of olivine and Ca-rich pyroxene (pigeonite). The px/(ol+px)-ratio is ~0.3. Common carbon-platelets (up to 1 mm) contain both graphite and diamond. Iron metal and rare troilite are only preserved as tiny inclusions in silicates. Abundant iron hydroxides at grain boundaries represents the bulk of completely oxidized metal. The shock grade of silicates is S2 (weak to strong undulose extincion). Silicates are weakly shocked. Strongly weathered.
Geochemistry: Olivine $Fa_{16.2\pm4.8}$ (3.7-19.1, n=15) with nearly pure forsterite in reduced rims; pigeonite 15.8±0.2 10.1±0.05 (n=10). Bulk analysis (ICP-OES) shows Fe/Mn (wt) = 51.4, Ni = 1460 ppm, Cr = 4960 ppm.
Classification: Based on texture and mineralogy this is a ureilite.
Specimens: All at *NMBE*.

Jiddat al Harasis 803 (JaH 803) 19°40'20.8"N, 56°13'22.2"E
Al Wusta, Oman
Found: Jan 2011
Classification: Ordinary chondrite (H5)

Petrography: (P. Strickland, *UAb*) Chondrules mainly PO, POP and RP averaging 0.4 mm in diameter. Irregular and planar fractures and undulatory extinction visible in the pyroxene and olivine.
Geochemistry: (C. Herd and P. Strickland, *UAb*). Olivine $Fa_{19.1\pm0.6}$ (n=21); Low-Ca Pyroxene $Fs_{16.9\pm0.1}$, $Wo_{1.3\pm0.2}$ (n=15).

Specimens: 29.3 g type specimen, including thin section, are on deposit at *UAb*. Main mass, including thin section, at *SQU*.

Jiddat al Harasis 804 (JaH 804) 19.829°N, 56.482°E
Al Wusta, Oman
Found: 2013 Jan
Classification: HED achondrite (Eucrite)
History: Found by a meteorite prospector in January 2013.
Petrography: (A. Irving, *UWS*; A. Wittmann, *WUSL*) Igneous texture with larger (>1 mm) grains of exsolved pigeonite and calcic plagioclase plus interstitial groundmass regions rich in finer plagioclase laths and vesicular glass. Plagioclase contains numerous blebs of troilite, and pigeonite consists of patchy zones of recrystallized Ca-rich and Ca-poor pyroxene. Some clinopyroxene and plagioclase occurs as symplectitic intergrowths. Other accessory phases are ilmenite, Ti-rich chromite, Ti-poor chromite, silica polymorph, and a single Ni-free Fe-metal grain. Secondary celestite and strontiobarite (crystals ~10 μm in size) are quite common.
Geochemistry: (S. Kuehner, *UWS*; A. Wittmann, *WUSL*): Orthopyroxene ($En_{55.2\text{-}57.8}Wo_{5.9\text{-}3.1}$, FeO/MnO = 32), clinopyroxene ($Fs_{27.0\text{-}27.6}Wo_{41.7\text{-}41.0}$, FeO/MnO = 31-34), plagioclase ($An_{86\text{-}91}Or_{0.4\text{-}0.5}$). Oxygen isotopes (K. Ziegler, *UNM*): analyses of acid-washed subsamples by laser fluorination gave (in per mil) $\delta^{17}O$ 1.561, 1.613; $\delta^{18}O$ 3.473, 3.501; $\Delta^{17}O$ -0.273, -0.236 (for a TFL slope of 0.528).
Classification: Eucrite. This specimen is unusual because it has a vesicular groundmass, yet its oxygen isotopic composition is similar to those of most eucrites.
Specimens: 24 g including one polished thin section at *UWB*. The remaining material is held by the anonymous finder.

Jiddat al Harasis 815 (JaH 815) 19°31’21.1"N, 55°13’10.2"E
Zufar, Oman
Found: 2013
Classification: Carbonaceous chondrite (CO3)
Petrography: (A. Greshake, *MNB*) The meteorite shows a light brownish interior and consists of numerous small chondrules, less abundant CAIs, and olivine amoeboids in a fine-grained matrix. Chondrule mean diameter is about 0.2 mm (largest chondrule measures 0.7 mm in diameter and POP chondrules are the most abundant type. Limonitic staining is present.

Jungo 004 40°57.306’N, 118°21.031’W
Humboldt County, Nevada, United States of America
Found: 15 Aug 10
Classification: Ordinary chondrite (H6)
History: A single stone was found by Mr. Scott Johnson on the north side of the Jungo dry lake bed on August 15, 2010. Two pieces of this stone were donated to *Cascadia* in July 2011.
Physical characteristics: The stone has a dark brownish-black exterior which represents a combination of weathered fusion crust and weathering rind. The cut face is reddish-brown and shows visible cracks and pits.
Petrography: (M. Hutson, *Cascadia*). The thin section is extensively cross-cut by fractures and weathering veins and heavily stained. Chondrules grade into a granular recrystallized matrix and ~10% of feldspar grains >=50 μm across. Metal and troilite heavily weathered. Many of the sulfide grains contain numerous angular silicate clasts concentrated towards the outer edge of the sulfide. Deformation of olivine is variable (S1-S5), with S3 material dominating the section.
Geochemistry: (M. Hutson, *Cascadia*) Olivine ($Fa_{20.6\pm0.6}$, n=22) and low-Ca pyroxene ($Fs_{18.3\pm0.7}Wo_{1.4\pm0.2}$, n=20).
Classification: Likely paired with Jungo 002 and Jungo 003.

Specimens: 21.0 g in three pieces and a polished thin section are on deposit at *Cascadia*. Mr. Scott Johnson holds the main mass.

Jungo 005 40°53.047N, 118°21.159W
Humboldt County, Nevada, United States of America
Found: 8 Oct 10
Classification: Ordinary chondrite (L6)
History: A single stone was found by Mr. Scott Johnson on the south side of the Jungo dry lake bed on October 8, 2010. A piece of this stone was donated to *Cascadia* in July 2011.
Physical characteristics: The stone has a dark brownish-black exterior which represents a combination of weathered fusion crust and weathering rind. The cut face is reddish-brown and is cross-cut by dark veins.
Petrography: (M. Hutson, *Cascadia*). Chondrules are discernible, but are well-integrated with coarse matrix. Individual feldspar grains are easily observed in transmitted light and have undulose extinction. Approximately 75-80% of the opaques have been replaced by terrestrial weathering product, indicative of weathering grade W3. Olivine grains show mild to strong undulose extinction with irregular fractures. The section contains a roughly ovoid igneous-textured inclusion ~6 mm × 7 mm in size, which contains olivine, high- and low-Ca pyroxenes, and feldspar. Mineral compositions are equilibrated with those in the host chondrite.
Geochemistry: (M. Hutson, *Cascadia*). Olivine ($Fa_{26.0\pm0.7}$, n=24) and low-Ca pyroxene ($Fs_{22.2\pm1.7}Wo_{1.6\pm0.3}$, n=10).
Specimens: A single 23.3 g piece and a polished thin section are on deposit at *Cascadia*. Mr. Scott Johnson holds the main mass.

Jungo 006 40°56.230N, 118°21.088W
Humboldt County, Nevada, United States of America
Found: 8 Oct 10
Classification: Ordinary chondrite (H5)
History: A single stone was found by Mr. Scott Johnson on the north side of the Jungo dry lake bed on October 8, 2010. Two pieces of this stone were donated to *Cascadia* in July 2011.
Physical characteristics: The stone has a dark brownish-black exterior which represents a combination of weathered fusion crust and weathering rind. The cut face is medium brown with reddish-colored veins.
Petrography: (M. Hutson, *Cascadia*). The thin section is heavily cross-cut by fractures and weathering veins. Remnant metal and sulfide suggest that some of the veins may be weathered shock veins. In the areas between the thick weathering veins, <= 50% of the opaques have been replaced. One side of the section has an abundance of relatively sharply defined chondrules, which appear to grade into a more integrated texture on the other side of the section. Olivine grains show strong undulose to mosaic extinction. A relatively large number of chromite-plagioclase intergrowths were observed, as were interconnected bands of feldspar with a fluidized texture.
Geochemistry: (M. Hutson, *Cascadia*) Olivine ($Fa_{18.2\pm0.5}$, n=16) and low-Ca pyroxene ($Fs_{17.1\pm0.6}Wo_{0.9\pm0.2}$, n=3).
Specimens: 13.5 g in three pieces and a polished thin section are on deposit at *Cascadia*. Mr. Scott Johnson holds the main mass.

Katol 21° 15' 50"N, 78° 35' 29"E
Maharashtra, India
Fell: 2012
Classification: Ordinary chondrite (L6)
History: On May 22, 2012, at 14:10 local time, a large meteor shower occurred over the town of Katol in the Nagpur District of India. The visual event was followed by 30 to 50 s of sonic booms. At least 30

stones were recovered by *GSI* in an ellipse centered around 21°15.837'N and 78°35.485'E. The fall was described by Mahajan and Murty (2012).
Physical characteristics: The largest stone is around 1 kg. Crust ranges from glossy (in stones that have little attraction to a magnet) to black and dull. In addition to the stones, at least five iron-rich objects were collected, the largest being a 7 × 5 × 2 cm, 136 g oriented shield. Total recovered mass is in excess of 13 kg. Interior of the fresh stones is medium grained with a sugary texture, and mottled whitish gray with distinct, scattered, light apple-green crystals to 1 mm. Black chromite to 1 mm. Thin shock veins common. One slice shows a thick several mm-thick, straight shock vein. Scattered clusters (to 200 μm) of transparent, honey-brown Ca-Cl phosphates visible in the fresh stones. On contact with water, the stones rapidly (within minutes) become orange stained.
Petrography: Sections and polished mounts were made from four separate stones. Slices of Katol are brittle. The meteorite is highly recrystallized and contains rare BO and PO chondrules (200 to 700 μm) that are well integrated into the matrix. Silicates contain abundant micrometer-sized metal and troilite blebs. Poikilitic texture with large (to 2 mm) low-Ca pyroxene oikocrysts containing rounded olivine chadacrysts. Olivine (to 1 mm) exhibits planar fractures and most grains show weak mosaicism, though rare grains show strong mosaicism. Plagioclase is free of cracks, >50 μm common, largest area 500 × 150 μm. Troilite is single crystal and lacks shock lamellae. Kamacite grains commonly exhibit holy-leaf-shaped outlines. These grains range from polycrystalline (crystals ~10 μm) to single crystals with poorly developed Neumann bands. There are large variations in metal and troilite content among stones, ranging from ~8 vol% metal and 5.5 vol% sulfide up iron-rich specimens with only minor silicates. Chromite, with sizes to ~1 mm, are extensively fractured. Well-developed taenite-plessite fields with dark-etch plessite is common. Metallic Cu common at the kamacite/troilite interfaces. Shock stage variable with evidence of S5 (strong mosaicism in a few olivine grains), but overall most silicates show undulatory extinction indicative of S2.
Geochemistry: (L. Garvie, *ASU*; G. Parthasarathy, *CSIR-NGRI*; K. Ziegler, *UNM*) EMPA for four separate stones gave the following: Stone 1 - $Fa_{23.6\pm0.4}$, FeO/MnO=46.6±2.8, n=7; $Fs_{19.9\pm0.2}Wo_{3.3\pm0.7}$, FeO/MnO=28.8±1.2, n=6; $An_{14.8\pm4.3}Ab_{81.8\pm3.1}Or_{4.0\pm1.2}$, n=5; chromite Fe#=83.3, Cr#=88.4. Stone 2 - $Fa_{24.6\pm0.3}$, FeO/MnO=48.3±2.7, n=10; $Fs_{20.5\pm0.4}Wo_{1.9\pm0.2}$, FeO/MnO=28.0±1.7, n=6. Stone 3 - $Fa_{24.8\pm0.5}$, n=12; $Fs_{23.3\pm0.8}Wo_{1.2}$, n=6. Stone 4 - $Fa_{26.4\pm0.5}$, $Fs_{24.0\pm0.7}Wo_{1.2}$, n=6. Oxygen isotope values on acid-washed non-magnetic material: $\delta^{17}O$ = 3.549, 3.596; $\delta^{18}O$ = 4.961, 4.867; $\Delta^{17}O$ = 0.930, 1.026 per mil. Bulk whole rock chemical analysis by XRF (mean of stones 3 and 4) Si 16.0, Fe 23.0, Mg 14.4, Al 1.5, Ca 1.64, Ni 1.34, Mn 0.18, Na 0.47, K 0.08, P 0.13, Ti 0.08, Cr 0.36, and S 2.04 (all wt%).
Classification: Ordinary chondrite, L6, W0.
Specimens: 64 g at *ASU*.

Keystone Lake 36°17'2.48"N, 96°26'13.22"W
Pawnee County, Oklahoma, USA
Found: 22 Dec 2003
Classification: Ordinary chondrite (L5)
History: A 787 g stone was found by Chris Cooper while searching for artifacts along the shore of Keystone Lake, 2.5 miles SE of Cleveland, Oklahoma.
Physical characteristics: Light- to dark-brown with a few patches of weathered crust.
Petrography: Unbrecciated texture with chondrules set in a dark weathered matrix. Shock level is S2 and weathering grade is W4.
Geochemistry: Olivine is $Fa_{25.3}$ (FeO/MnO = 52); low Ca pyroxene is $Fs_{21.4}Wo_{1.4}$; rare metal, Ni = 5.2 wt %.
Classification: Ordinary chondrite (L5).
Specimens: 22 g at *PSF*. Chris Cooper holds the main mass.

Kharabali 47°27.42'N, 47°32.31'E
Astrakhanskaya oblast', Russia

Found: before 2001
Classification: Ordinary chondrite (H5)
History: The stone was found on the flat steppes in the Kharabalinsky district, Astrakhan region, Russia. It was known to local people as a conspicuous strange magnetic stone for at least 10 years. Mr. Kotelevskyi sampled the stone in the summer of 2011, and passed the sample to *Vernad* during October 2012. Later, many small fragments of the meteorite were found around the main mass.
Physical characteristics: The stone is elliptically shaped (70 × 40 × 50 cm), dark-brown with reddish-brown patches, and fusion crusted.

Ksar Daghara 001 (KD 001) 32.956°N, 10.484°E
Tatawin, Tunisia
Found: 2012 Apr
Classification: Ordinary chondrite (H6)
History: Found by *Kuntz* while prospecting in the Tatahouine diogenite strewnfield.
Physical characteristics: A single small stone (18.36 g) in four pieces.
Petrography: (A. Irving and S. Kuehner, *UWS*) Extensively recrystallized with rare chondrules, fairly abundant altered metal and some cross-cutting goethite veinlets.
Geochemistry: Olivine ($Fa_{18.6\text{-}19.5}$), orthopyroxene ($Fs_{16.4\text{-}16.7}Wo_{1.1\text{-}1.2}$), clinopyroxene ($Fs_{9.6}Wo_{42.8}$).
Classification: Ordinary chondrite (H6).
Specimens: 3.8 g and one polished thin section are on deposit at *UWB*. The main mass is held by *Kuntz*.

Ksar Daghara 002 (KD 002) 32.960°N, 10.479°E
Tatawin, Tunisia
Found: 2012 Apr
Classification: Ordinary chondrite (H6)
History: Found by Pierre-Marie Pele while prospecting in the Tatahouine diogenite strewnfield.
Physical characteristics: A single small, elongate stone (30.08 g).
Petrography: (A. Irving and S. Kuehner, *UWS*) Extensively recrystallized with rare chondrules, abundant altered metal and cross-cutting goethite veinlets. Composed of olivine, orthopyroxene, sodic plagioclase, chromite, troilite and altered kamacite.
Geochemistry: Olivine ($Fa_{17.8\text{-}18.0}$), orthopyroxene ($Fs_{16.0\text{-}17.3}Wo_{1.0\text{-}0.9}$).
Classification: Ordinary chondrite (H6).
Specimens: A total of 6.1 g of type material and one polished thin section are on deposit at *UWB*. The main mass is held by P-M. Pele.

Ksar Ghilane 012 (KG 012) 32.870° N, 9.921° E
Quibili, Tunisia
Found: April 2012
Classification: Ordinary chondrite (H6)
History: Found by F. Kuntz in April 2012 while prospecting for meteorites in the desert west of Tataouine, Tunisia.
Petrography: Extensively recrystallized with sparse chondrule remnants.
Geochemistry: Olivine ($Fa_{19.0\text{-}19.4}$), orthopyroxene ($Fs_{17.3\text{-}17.5}Wo_{0.9\text{-}1.5}$), clinopyroxene ($Fs_{6.4\text{-}6.8}Wo_{45.5\text{-}44.8}$).

Ksar Ghilane 013 (KG 013) 32.869° N, 9.914° E
Quibili, Tunisia
Found: April 2012
Classification: Ordinary chondrite (H5)
History: Found by F. Kuntz in April 2012 while prospecting for meteorites in the desert west of Tataouine, Tunisia.
Petrography: Sparse chondrules are present within a recrystallized matrix.

Geochemistry: Olivine ($Fa_{20.0\text{-}20.4}$), orthopyroxene ($Fs_{17.4\text{-}17.5}Wo_{1.3\text{-}1.4}$), clinopyroxene ($Fs_{7.0\text{-}11.9}Wo_{45.2\text{-}43.9}$).

Ksar Ghilane 014 (KG 014) 32.887° N, 9.890° E
Quibili, Tunisia
Found: April 2012
Classification: Ordinary chondrite (H4)
History: Found by F. Kuntz in April 2012 while prospecting for meteorites in the desert west of Tataouine, Tunisia.
Petrography: Fairly well-developed chondrules within a recrystallized matrix.
Geochemistry: Olivine ($Fa_{18.0\text{-}18.2}$), orthopyroxene ($Fs_{16.1\text{-}16.2}Wo_{1.6\text{-}1.7}$), clinopyroxene ($Fs_{6.3\text{-}6.4}Wo_{44.6\text{-}44.7}$).

Ksar Ghilane 015 (KG 015) 32.889° N, 9.884° E
Quibili, Tunisia
Found: April 2012
Classification: Ordinary chondrite (H4)
History: Found by F. Kuntz in April 2012 while prospecting for meteorites in the desert west of Tataouine, Tunisia.
Petrography: Fairly well-developed chondrules within a recrystallized matrix.
Geochemistry: Olivine ($Fa_{18.1\text{-}18.2}$), orthopyroxene ($Fs_{16.4\text{-}16.9}Wo_{1.7\text{-}1.6}$), clinopyroxene ($Fs_{6.0\text{-}6.4}Wo_{46.1\text{-}45.6}$).

Kumtag 004 41°30’N, 93°33’E
Xinjiang, China
Found: 17 May 2012
Classification: Ordinary chondrite (L5)
History: On 17 May 2012, a meteorite was found in the Kumtag Desert when geologist Le Kesi was working for the geological survey.
Physical characteristics: A 2 g cuboid shaped (1.6 × 1.5 × 0.2 cm) rock lacking fusion crust.
Petrography: (B. Miao, C. Zhang, *GUT*): Chondrule outlines indistinct under the optical microscope, but well defined in BSE image. Recognizable chondrule types include: porphyritic olivine, porphyritic pyroxene, porphyritic olivine-pyroxene, granular olivine, barred olivine, radial pyroxene, cryptocrystalline. The matrix largely recrystallized, but few fine-grained grains are visible. About 80% of metal and troilite grains are weathered. Olivine exhibits undulose extinction, planar fractures, weak mosaic extinction.
Geochemistry: Olivine: $Fa_{23.4\pm0.5}$, n=17, Low-Ca pyroxene: $Fs_{19.8\pm0.5}Wo_{1.2\pm0.4}$, n=24.
Classification: Ordinary chondrite (L4); S4; W3.
Specimens: Two thin sections are deposited in *GUT*.

Ladkee 24°22’40"N, 69°40’50"E
Sind, Pakistan
Fell: 4 May 2012
Classification: Ordinary chondrite (H6)
History: According to Ghulam Mustafa Laghari (SUPARCO), on May 4, 2012 around 10:30 pm local time (5:30 pm UTC), many people in the Tharpakar district, Sindh province of Pakistan, observed a fireball that disintegrated into many pieces. Some of the villagers in the town of Ladkee were sitting outside the Government Primary School and heard the sound of an object falling to the ground in the school’s backyard, but because of darkness they were unable to find it immediately. The next morning they went to the school’s backyard and found a 69 g black stone in a small crater of sand.
Physical characteristics: Single, complete, fresh black fusion-crusted stone. Broken surface reveals a fine mix of light gray, light brown, and metallic grains.
Petrography: (C. Agee, *UNM*) Microprobe examination shows a texturally equilibrated chondrite with a few indistinct chondrules, plagioclase up to 100 μm, abundant kamacite.

Geochemistry: (C. Agee,*UNM*) Olivine $Fa_{18.8\pm0.3}$, Fe/Mn= 38±1, n=3; low-Ca pyroxene $Fs_{16.8\pm0.1}Wo_{1.5\pm0.2}$, Fe/Mn= 22±1, n=3.
Classification: Ordinary chondrite (H6), weathering grade (W0).
Specimens: 14 g including a microprobe mount on deposit *UNM*, main mass is held by Pakistan Space and Upper Atmosphere Research Commission (SUPARCO).

Left Hand Creek 40°7.64'N, 105°17.62'W
Boulder County, Colorado, United States
Found: Aug 2000
Classification: Iron meteorite (IAB complex)
History: In August, 2000, a single weathered meteorite was found in colluvium on the eastern flank of the Dakota hogback near Left Hand Creek, Boulder County, Colorado. A person digging a posthole hit a large rock; it was decided not to move the hole but to remove the rock, a rusty 8.671 kg iron meteorite.
Geochemistry: (J.T. Wasson, *UCLA*) Analytical Data: structure = Og, bandwidth = ~2 mm, Co = 4.66 mg/g, Ni = 69.6 mg/g, Ga = 87.3 **µ**g/g, Ge = 340 **µ**g/g, As = 14.3 **µ**g/g, Ir = 1.89 **µ**g/g, and Au = 1.648 **µ**g/g. Despite compositional similarities, this seems not to be transported mass from the Canyon Diablo strewn field. It shows resolvable differences in Ir (1.9 **µ**g/g, lower than the lowest CD mean of 2.1 **µ**g/g), As (14.3 **µ**g/g, higher than the highest CD mean of 13.5 **µ**g/g with the exception of Canyon Diablo (1949), ~16 **µ**g/g) as well as slightly high Ga and Au.

Libaros 32°14'42"S, 59°00'11"W
Entre Rios, Argentina
Found: 28 May 2002
Classification: Ordinary chondrite (H5)
History: A single mass was plowed up by a farmer.
Physical characteristics: A collection of ~12 heavily weathered fragments.
Petrography: Chondrules distinct (dominantly porphyritic but also barred olivine, cryptocrystalline and radial pyroxene textures), up to 1 mm, often fractured, many truncated such that they appear to belong to breccia clasts, although boundaries are not well defined. Olivine shows only minor undulatory extinction and rare planar fractures, indicating weak shock deformation. Matrix is dark with moderate to heavy oxidation.
Specimens: 20.9 g type specimen, including polished thin section, are on deposit at *SI*.

Los Vientos 017 (LoV 017) ~24°41'S, ~69°46'W
Antofagasta, Chile
Found: 2011 Jun 24
Classification: Ureilite
History: The meteorite was found by R. Martinez in the Atacama Desert.
Physical characteristics: A single dark stone.
Petrography: (J. Gattacceca, *CEREGE*) This meteorite consists mostly of euhedral olivine (up to 4 mm, mean 1.5 mm), with subordinate pigeonite. Coarse-grained equigranular texture with triple junctions. Olivine shows a reduced margin. Interstitial metal along grain boundaries.
Geochemistry: Olivine cores $Fa_{14.9\pm1.8}$, FeO/MnO=30.2.Olivine reduced rims $Fa_{8.4\pm1.1}$, FeO/MnO=16.3. Olivine CaO 0.37±0.04 wt.%, Cr2O2=0.71±0.07 wt.%. Pigeonite $Fs_{12.8\pm1.2}Wo_{7.2\pm2.0.}$ Kamacite 4.8 wt.% Ni.
Classification: Ureilite
Specimens: 28 g and two polished sections at *CEREGE*. Main mass Museo del Meteorito.

Los Vientos 043 (LoV 043) 24°41'S, 69°46'W
Antofagasta, Chile
Found: 2012 Feb
Classification: Carbonaceous chondrite (CR2)

History: A single stone was found in the Atacama desert in February 2012 by Michael Warner.
Physical characteristics: A single rusted stone.
Petrography: (J. Gattacceca, *CEREGE*) Chondrules up to 2.5 mm (average diameter 950 μm, often rimmed by metal blebs) make up 60% of the meteorite, matrix 32%, and metal + oxides 8%. Metal blebs up to 400 μm in diameter are found in the chondrules and in the matrix. Presence of dusty olivine.
Geochemistry: Olivine $Fa_{0.4}$, orthopyroxene $Fs_{1.0}Wo_{0.7.}$ Some chondrules contain plagioclase $An_{27.9}Ab_{66.3}Or_{5.8.}$ Magnetic susceptibility log $\chi = 4.76$.
Classification: CR2. Severe weathering
Specimens: 1.5 g and a polished section at *CEREGE*. Main mass with Michael Warner.

Los Vientos 054 (LoV 054) ~24°41'S, ~69°46'W
Antofagasta, Chile
Found: 2012 Jul 12
Classification: HED achondrite (Eucrite, monomict)
History: The meteorite was found in 2012 by Luc Labenne in the Atacama Desert.
Physical characteristics: A single stone with shiny fusion crust on one side. The other side displays the light-grey interior of the meteorite.
Petrography: (J. Gattacceca, *CEREGE*) Brecciated ophitic to subophitic texture. Contains orthopyroxene and Ca-pyroxene (both with exsolution lamellae), plagioclase, silica, ilmenite, chromite, troilite, metal.
Geochemistry: Orthopyroxene $Fs_{57.9\pm2.9}Wo_{2.1\pm0.4}$, FeO/MnO = 29.5±0.8. Ca-pyroxene $Fs_{43.6\pm9.3}Wo_{26.5\pm8.2}$, FeO/MnO = 29.0±0.9. Plagioclase $An_{87.5}Or_{0.9}$ Magnetic susceptibility log $\chi = 2.65$.
Classification: Achondrite (eucrite, monomict). Moderate weathering.
Specimens: 4.2 g and a polished section at *CEREGE*. Main mass with *Labenne*.

Los Vientos 055 (LoV 055) ~24°41'S, ~69°46'W
Antofagasta, Chile
Found: 2012 Jul 14
Classification: Carbonaceous chondrite (CO3)
History: The meteorite was found in 2012 by Luc Labenne in the Atacama Desert.
Physical characteristics: A single stone with about 30% of the surface covered by fusion crust.
Petrography: (J. Gattacceca, *CEREGE*) Abundant chondrules, predominantly of type I, in a dark matrix. chondrule:matrix ratio is 1:1. Olivine in type I chondrules are zoned. Chondrule size ranges from <100 μm to 700 μm with an average 135±87 μm (N=60).
Geochemistry: Olivine in the range Fa0.6-$Fa_{57.7}$ (mean $Fa_{16.0\pm16.4}$, PMD=86%, N=20). Low-Ca pyroxene $Fs_{1.6}Wo_{0.9.}$ Cr_2O_3 in ferroan olivine is 0.07±0.11 wt% (N=17). Magnetic susceptibility log $\chi = 3.95$ (χ in 10^{-9} m^3/kg).
Classification: Carbonaceous chondrite (CO3). Moderate weathering
Specimens: 8.9 g and a polished section at *CEREGE*. Main mass with *Labenne*.

Creating a new writeup for **LV 122**: mass = 2.3 g; type = H5; year = 2012

Paste the writeup here. Note, if you copy from MSWord, you can right click and select "Paste from MS Word" to get rid of unwanted formatting.
Mreïra 25°57.550'N, 10°57.615'W
Tiris Zemmour, Mauritania
Found: Dec 2012
Classification: Ordinary chondrite (L6)
History: According to Ait Hiba Abdelhad, a fireball was seen in the afternoon sky on December 16, 2012, several school children saw the fireball explode and detonations were heard near the village of Mehaires, Western Sahara. Pieces were recovered approximately 40 miles south of Mehaires, near Mreïra, Mauritania, only a few days after the event. The strewn field is in the area called "Stailt

Omgrain", which is a local nomadic name. This is south of Mehaires and north of the mountain "Galbe lahmar". Therefore this is a possible fall associated with the fireball of December 16, 2012.
Physical characteristics: The largest single piece weighed 602 grams and was completely covered with fresh fusion crust. A total of approximately 6 kg of freshly crusted stones were recovered.
Petrography: (C. Agee, *UNM*) Microprobe examination of two polished surfaces shows brecciation and numerous fractured silicate grains, scattered equilibrated chondrules, shock-melt pockets, kamacite, troilite, and merrillite. Fresh, vesiculated fusion crust ~200 μm thick.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{24.4\pm0.2}$, Fe/Mn= 47±3, n=8; low-Ca pyroxene $Fs_{20.3\pm0.1}Wo_{1.5\pm0.1}$, Fe/Mn= 28±1, n=7; plagioclase $Ab_{82.7\pm2.0}An_{10.4\pm0.6}Or_{6.8\pm1.4}$, n=4.
Classification: Ordinary chondrite (L6), weathering grade (W0), shock grade (S6)
Specimens: 91.2 g including a fusion-crusted complete stone and a microprobe mount on deposit at *UNM*, *MtMorgan* holds the 602 g main mass and another 400 g of complete stones, Gary Fujihara holds 335 g of fusion crusted individuals, the largest being 104 g.

Mreïra, *change in fall status*

New data on the Mreïra L6 chondrite support a change in its status to "Probable fall." It had been listed as a find in *MetBull* 102. Magnetic susceptibility is log $\chi = 4.76$ (χ in 10^{-9} Am^2/kg). Gamma activity analysis by A. Jambon (*UPVI*) and P. Weber (*Bern*): the presence of ^{22}Na and ^{54}Mn (half-lives of 2.6 and 0.85 a, respectively) indicates a recent fall. The $^{22}Na/^{54}Mn$ and $^{22}Na/^{26}Al$ ratios of 0.61 and 1.4, respectively, are consistent with a fall date of December 16, 2012.

Northwest Africa 231 (NWA 231)
(Northwest Africa)
Found: 2000
Classification: Ordinary chondrite (L5)
History: Michael Cottingham acquired the sample from a meteorite prospector in 2000 and the main mass was later sold to John Cabassi.
Physical characteristics: One sub-rounded 1054 g stone, with desert patina.
Petrography: (A. Love, *App*): Sample displays recrystallized chondritic texture crosscut by subparallel shock veins and fractures. Chondrules not well defined, have flattened oblate shapes, irregular boundaries, lack glassy mesostasis and have an average diameter of 1.10 mm.
Specimens: Five slices weighing 25.96 g, a polished mount with approximately 2.5 g and a thin section are currently on deposit at *App*.

Northwest Africa 615 (NWA 615)
(Northwest Africa)
Purchased: Nov 2000
Classification: Ordinary chondrite (L6)
History: One subrounded stone containing desert patina and weighing 476 g was found and sold to Michael Cottingham in Morocco. Thomas Webb acquired the sample in November 2000.
Physical characteristics: The stone is brown and has a flattened oblate shape. Fusion crust absent. The cut face of the interior of the stone is mottled tan and dark orange and shows unweathered flakes of metal. Black shock veins present.
Petrography: (A. Love, *App*): Sample displays recrystallized chondritic texture crosscut by shock veins containing ringwoodite. Chondrules absent.
Geochemistry: $Fa_{23.3\pm0.5}$ (N=14), Low Ca pyroxene $Fs_{22.1\pm0.7}Wo_{2.2\pm0.9}$ (N=12).
Classification: Ordinary Chondrite (L6 S6 W2)
Specimens: 22.40 g and 1 polished thin section are on deposit at *App*

Northwest Africa 2043 (NWA 2043)

(Northwest Africa)
Purchased: 2003 Aug
Classification: Carbonaceous chondrite (CK3)

History: Purchased from a Moroccan dealer in Erfoud for D. Gregory in August 2003.
Physical characteristics: A single dark green, friable stone weighing 34.9 g.
Petrography: (A. Irving and S. Kuehner, *UWS*; T. Bunch, *NAU*) Sparse, relatively small (up to 0.6 mm across), well-formed POP chondrules and ellipsoidal oxide-sulfide-rich objects (0.030-0.140 mm diameter, some within chondrules) in a dark, porous matrix. Olivine in chondrules is compositionally zoned, and pyroxene has pigeonite cores mantled by orthopyroxene. The oxide-sulfide-rich objects are composed predominantly of Cr-bearing magnetite and Ni-bearing pyrrhotite with accessory djerfisherite and chlorapatite. One small object composed of Al-rich, Cr-bearing spinel and chlorapatite may be a type of CAI. The unrecrystallized matrix consists of olivine and lath-like aggregates of plagioclase, aluminous orthopyroxene and aluminous pigeonite, with apparently primary porosity.
Geochemistry: Olivine ($Fa_{18.4-33.8}$, mean Fa_{30}, FeO/MnO = 54-124), orthopyroxene ($Fs_{23.8-24.1}Wo_{0.4-0.5}$, FeO/MnO = 79.4-85.1, Al_2O_3 = 4.0-4.6 wt.%), pigeonite cores ($Fs_{1.7-1.9}Wo_{11.2-10.7}$, FeO/MnO = 3.2-3.4, Al_2O_3 = 1.6-2.7 wt.%), plagioclase ($An_{32.2}Or_{2.0}$). Oxygen isotopes (D. Rumble, *CIW*): analyses of two acid-washed whole rock fragments by laser fluorination gave, respectively, $\delta^{18}O$ = -0.84, -0.97; $\delta^{17}O$ = -3.88, -4.08; $\Delta^{17}O$ = -3.441, -3.576 per mil.
Classification: Carbonaceous chondrite (CK3). The oxygen isotopic composition of this specimen is ambiguous, since it plots near the trends for CM, CO and CK chondrites. Although this composition lies above the trend defined by CK chondrites such as NWA 1665, NWA 1905, NWA 3155 and NWA 4800, the presence of chromian magnetite, lack of metal and lack of primary hydrous phases in NWA 2043 all imply an affinity with CK chondrites rather than CO or CM chondrites.
Specimens: A total of 5.7 g, one polished thin section prepared from it, and one polished mount are on deposit at *UWS*; the remaining 28.5 g main mass is archived at *ROM*.

Northwest Africa 3197 (NWA 3197)
(Northwest Africa)
Purchased: 2010 Feb
Classification: HED achondrite (Howardite)

History: Purchased by Peter Utas in 2010 February from a Moroccan dealer at the Tucson Gem and Mineral Show.
Physical characteristics: A single, fine-grained breccia (324 g) containing abundant clasts with evident altered metal.
Petrography: (A. Irving and S. Kuehner, *UWS*) Complex polymict breccia composed of clasts and crystal debris from several types of gabbroic eucrites and diogenites, plus large clasts of metal-bearing ordinary chondrites exhibiting various levels of shock. The howardite portions contain small diogenite clasts and angular grains of orthopyroxene, pigeonite (some exsolved), calcic plagioclase, silica polymorph, chromite and troilite. Chondrite clasts contain sparse chondrules and abundant altered kamacite, and some have extensive marginal zones composed of very fine grained, recrystallized silicates with larger, rounded globules of intergrown metal and troilite.
Geochemistry: Orthopyroxene ($Fs_{17.8}Wo_{1.7}$; $Fs_{26.6}Wo_{3.1}$; $Fs_{36.3}Wo_{2.3}$; FeO/MnO = 26-32), clinopyroxene exsolution lamellae ($Fs_{23.9-26.1}Wo_{43.4-42.5}$, FeO/MnO = 29-30). Olivine in chondritic clasts ($Fa_{15.3-18.9}$, FeO/MnO = 39-32).
Classification: Howardite. The specimen is anomalous in that it contains clasts of recrystallized and shocked H chondrite material.

Northwest Africa 3339 (NWA 3339)
(Northwest Africa)
Purchased: 2006-Apr
Classification: Mesosiderite

History: Purchased by *Kuntz* in April 2006 from a dealer in Er Rachidia, Morocco.
Physical characteristics: A single, dense, medium-grained stony-iron mass (711 g), with visible metal representing about half of the specimen.
Petrography: (P. Sipiera, *FMNH*) Aggregate of predominantly low-Ca pyroxene, calcic plagioclase and metal (kamacite+taenite) with subordinate amounts of olivine and merrillite.
Geochemistry: (S. Kuehner, *UWS*) Olivine ($Fa_{9.0\text{-}27.1}$; FeO/MnO = 38-58), low-Ca pyroxene ($Fs_{28.7\text{-}39.3}Wo_{4.3\text{-}8.0}$; FeO/MnO = 22.5-22.6).
Classification: Mesosiderite. Most likely paired with NWA 1827, NWA 1879 and NWA 2042 (and possibly other NWA specimens discovered and studied around the same time, but not examined by the present classifiers).
Specimens: A total of 38.7 g of type material is on deposit at *PSF*. The main mass is held by *Kuntz*.

Northwest Africa 4049 (NWA 4049)
(Northwest Africa)
Purchased: Oct 2003
Classification: Mesosiderite (group B2)
History: The sample was purchased in October, 2003, from a Moroccan trader by Mr. Thompson, and a portion was donated to *Cascadia* on April 6, 2005.
Physical characteristics: Large cut faces show ~40% metal, sometimes in subrounded to subangular clasts up to 7 mm across, and the presence of silicate clasts up to 1 cm across, with minor rustiness overall.
Petrography: (A. Ruzicka and K. Farley, *Cascadia*) Thin section examination reveals lightly deformed silicate mineral and lithic clasts composed chiefly of low-Ca pyroxene, high-Ca pyroxene, and plagioclase set in a granoblastic groundmass of the same minerals. Metal is minimally weathered (grade W1).
Geochemistry: (K. Farley and A. Ruzicka, *Cascadia*) Phase compositions are uniform for plagioclase ($An_{94.3\pm0.1}\,Or_{0.2\pm0.2}$, N=21), but more variable for low-Ca pyroxene ($Wo_{2.8\pm0.9}\,Fs_{29.9\pm4.1}$ Fe/Mn =25.7±4.1, N=16) and high-Ca pyroxene ($Wo_{39.6\pm8.1}\,Fs_{16.1\pm3.7}$ Fe/Mn = 17.8±2.5, N=10) (atomic units).
Classification: Stony-iron (mesosiderite). Textures and mineralogy suggest a group B mesosiderite of textural type 2.
Specimens: 55 g slice, 2 polished thin sections, and 2 butts at *Cascadia*. *Thompson* holds the main mass.

Northwest Africa 4197 (NWA 4197)
(Northwest Africa)
Purchased: 2005 Oct 27
Classification: HED achondrite (Eucrite, polymict)
Petrography: (K. Metzler, *IfP*) Breccia consisting of ophitic, subophitic, and gabbroic eucrite clasts, melt rock clasts and mineral fragments set into a fine-grained, recrystallized matrix. $An_{87\pm2.}$

Northwest Africa 4522 (NWA 4522)
Northwest Africa
Purchased: Oct 2006
Classification: Ordinary chondrite (LL3)
Petrography: (K.Metzler, *IfP*) Genomict breccia, dominated by chondrules and chondrule fragments set in a fine-grained clastic matrix. Dark chondritic lithic clasts of petrologic type 3 (various subtypes) occur with sizes up to several cm. Many of these clasts show only small amounts of matrix. One fragment-rich melt clast found.
Geochemistry: (R. Pickard, *BathO*; K.Metzler, *IfP*) Olivine and pyroxene compositions were measured in two dark chondritic lithic clasts. One clast is of petrologic type <3.5 ($Fa_{12.9\pm8.1}$, n=21; $Fs_{9.8\pm8.3}$, n=31) the other is of petrologic type 3.5 ($Fa_{19.7\pm8.8}$, n=26; $Fs_{13.1\pm8.8}$, n=27). The olivine and pyroxene statistics for the bulk sample ($Fa_{28.4\pm4.7}$; n=44 and $Fs_{17.0\pm6.7}$; n=37, respectively) indicate that the clastic matrix of this

meteorite contains components of petrologic type >3.5. Oxygen isotopes (A. Pack, *UGött*): acid-washed bulk sample analyzed by laser fluorination gave $\delta^{18}O$=5.55, $\delta^{17}O$=3.84, $\Delta^{17}O$=0.92
Specimens: 71.2 g *IfP*; 20 g *BathO*.

Northwest Africa 5377 (NWA 5377)
Morocco
Purchased: 2008
Classification: Carbonaceous chondrite (C3, ungrouped)
History: Purchased by Aziz Habibi in Erfoud, Morocco, 2008.
Physical characteristics: Single stone
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows dominant (~75% volume) fine-grained matrix, chondrule size 50-200 μm.
Geochemistry: (A. Greshake, *MNB*) Olivine mean $Fa_{11.3}$, range $Fa_{0.2\text{-}46.5}$; low-Ca pyroxene mean $Fs_{4.4}$, range $Fs_{1.2\text{-}10.2.}$ (Karen Ziegler, *UNM*) Oxygen isotope mean values of 7 analyses on 3 acid-washed aliquots of bulk sample, 1.2, 1.8, 1.6 mg, gave $\delta^{17}O$= -9.481,-9.274, -9.282, $\delta^{18}O$= -6.467, -6.155, -5.726, $\Delta^{17}O$= -6.067, -6.025, -6.259 (linearized, all permil).
Classification: Carbonaceous chondrite (ungrouped), oxygen isotope values are significantly outside the range and lower than CO3, but on the CCAM, shock grade S2, weathering grade W2.
Specimens: 5 g on deposit at *MNB*, probe mount at *UNM*. Aziz Habibi holds the main mass.

Northwest Africa 5580 (NWA 5580)
(Northwest Africa)
Purchased: 2007
Classification: Carbonaceous chondrite (CK4, anomalous)
Petrography: The meteorite consists of sharply defined chondrules, mineral fragments, and few small CAIs set in a fine-grained dark greenish matrix. Cr magnetitie abundant. Rare intergrown magnetite, pyrrhotite, and ilmenite.
Geochemistry: (A. Greshake, *MNB*): Olivine composition, $Fa_{25.2}$, is anomalously iron-poor for CK group. Minor feldspar $An_{33.1}Ab_{62.7.}$

Northwest Africa 5748 (NWA 5748)
(Northwest Africa)
Purchased: 2008 Dec 12
Classification: HED achondrite (Howardite)
Petrography: (K. Metzler, *IfP*) Fine-grained breccia consisting of small subophitic and gabbroic eucrite clasts and eucritic and diogenitic mineral fragments. Clasts of fragment-rich and fragment-poor impact melt rocks occur, some of which are glassy. Isolated glass spherules are also present. $An_{90.5\pm4.5}$

Northwest Africa 5751 (NWA 5751)
(Northwest Africa)
Purchased: 2008 Dec 12
Classification: HED achondrite (Howardite)
Petrography: (K. Metzler, *IfP*) Fine-grained breccia, consisting mainly of eucritic and diogenitic mineral fragments with embedded subophitic eucrite clasts and diogenitic pyroxene fragments. Impact melt rock clasts occur and some olivine fragments are present. $An_{89\pm6}$

Northwest Africa 5774 (NWA 5774)
(Northwest Africa)
Purchased: 2005 Jun
Classification: HED achondrite (Eucrite, polymict)
History: Purchased by F. Kuntz in June 2005 from a dealer in Morocco.

Petrography: (A. Irving and S. Kuehner) Fresh fragmental breccia composed mainly of gabbroic eucrite clasts and related crystalline debris, plus ~5 vol.% orthopyroxene grains derived from diogenites. The eucrite material consists of exsolved pigeonite, calcic plagioclase,silica polymorph, subcalcic ferroaugite, fayalite, ferrosilite, symplectititc intergrowths of fayalite+hedenbergite+silcia, ilmenite, Ti-poor chromite, Ti-rich chromite and troilite.
Geochemistry: Olivine ($Fa_{77.1}$, FeO/MnO = 44.6), diogenitic orthopyroxene ($Fs_{26.1}Wo_{3.9}$, FeO/MnO = 31), pigeonite ($Fs_{36.6}Wo_{6.0}$; $Fs_{53.3}Wo_{10.1}$; FeO/Mn) = 29-30), subcalcic ferroaugite ($Fs_{64.4}Wo_{28.7}$, FeO/MnO = 37), low-Ca pyroxene host ($Fs_{54.8}Wo_{8.4}$, FeO/MnO = 31), clinopyroxene exsolution lamella ($Fs_{31.0}Wo_{39.0}$, FeO/MnO = 31).
Classification: Eucrite (polymict).
Specimens: Type specimen plus one polished thin section at *PSF*; main mass with *Kuntz*.

Northwest Africa 5785 (NWA 5785)
(Northwest Africa)
Purchased: 2005 Feb
Classification: HED achondrite (Eucrite, polymict)
History: Purchased in Feb 2005 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fragmental breccia consisting of basaltic eucrite clasts composed predominantly of exsolved pigeonite and calcic plagioclase with accessory silica polymoprh, Ti-chromite, troilite and Ni-free metal. Some clasts containing more metal are heavily stained with secondary iron hydroxides.
Geochemistry: Orthopyroxene host ($Fs_{57.8\text{-}58.9}Wo_{3.0\text{-}2.8}$, FeO/MnO = 27-28), clinopyroxene exsolution lamellae ($Fs_{26.3\text{-}27.2}Wo_{42.8\text{-}41.2}$, FeO/MnO = 26-28).
Classification: Eucrite (polymict).
Specimens: Type specimen plus one polished thin section at *PSF*; main mass with anonymous collector.

Northwest Africa 6013 (NWA 6013)
(Northwest Africa)
Purchased: 2009 Oct 28
Classification: HED achondrite (Diogenite, olivine)
Petrography: (K. Metzler, *IfP*) Coarse-grained ultramafic rock consisting of cm-sized domains that are dominated by olivine and pyroxene, respectively. The modal abundances of these subunits are about 50 vol% each. The transitions between them are blurred and the overall texture gives the impression of a metamorphic rock. In pyroxene-rich domains olivine occurs poicilitically enclosed in pyroxene crystals. Chromite grains with sizes up to several mm can be found. Troilite and metallic iron are minor constituents. Possibly paired with NWA 5480.
Geochemistry: Chromite: Cr/(Cr+Al)=0.79-0.84; Mg/(Mg+Fe)=0.18-0.29; TiO_2=0.5-0.7 wt%
Classification: Hartzburgitic diogenite

Northwest Africa 6045 (NWA 6045)
(Northwest Africa)
Purchased: 2008
Classification: Ureilite
Petrography: The rock displays a characteristic cumulate texture of up to 1-mm-sized olivine, compositionally zoned orthopyroxene, and pigeonite grains. Olivine shows characteristic reduced rims.
Geochemistry: Reduced rims in olivine: $Fa_{2.5\text{-}5.3}$; opx: $Fs_{1.2\text{-}4.7}Wo_{1.2\text{-}4.8}$; pigeonite $Fs_{11.3}Wo_{9.1}$

Northwest Africa 6048 (NWA 6048)
(Northwest Africa)
Purchased: 2009
Classification: HED achondrite (Eucrite, polymict)

Petrography: The meteorite consists of different lithic clasts and larger mineral fragments set in a finer grained clastic groundmass. Lithic clasts are dominatly basaltic and dark impact melt clasts. Larger mineral fragments are calcic plagioclase and pyroxenes with very fine exsolution lamellae. Minor phases include silica polymorphs, chromite and FeS. Some regions show brownish staining due to terrestrial alteration.
Geochemistry: low-Ca pyroxene: $Fs_{29.9\text{-}49.7}Wo_{5.9\text{-}9.5}$; Ca-rich pyroxene: $Fs_{43.6\text{-}54.2}Wo_{15.2\text{-}29.1}$; calcic plagioclase: $An_{87.8\text{-}92.1}$

Northwest Africa 6082 (NWA 6082)
(Northwest Africa)
Purchased: 2008 Sep
Classification: Ordinary chondrite (LL3)
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively metal-poor specimen containing well-formed, fairly large (to 1 mm) chondrules. The content of metal (+ minor Fe hydroxide) = 2 vol%. Minerals are olivine, low-Ca pyroxene, subcalcic augite, sodic plagioclase, altered kamacite, chromite, iron phosphide, troilite.
Geochemistry: Olivine ($Fa_{13.0\text{-}59.3}$; Cr_2O_3 in ferroan olivine 0.04-0.08 wt.%, mean 0.06, s.d. 0.01, N = 7), low-Ca pyroxene ($Fs_{1.2\text{-}19.5}Wo_{0.5\text{-}6.0}$), subcalcic augite ($Fs_{23.7\text{-}39.6}Wo_{26.7\text{-}31.6}$). Oxygen isotopes (D. Rumble, *CIW*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{18}O$ 5.91, 5.99; $\delta^{17}O$ 3.84, 3.82; $\Delta^{17}O$ 0.730, 0.669 per mil.
Classification: Chondrite (LL3.5). Subtype estimated to be 3.5 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 6108 (NWA 6108)
(Northwest Africa)
Purchased: 2004
Classification: Ordinary chondrite (L, melt rock)
History: Many fragments of one broken stone were collected in a small area.
Petrography: The meteorite is medium-grained melt breccia, consisting of 100-500 μm clasts of minerals and chondrules, joined together by devitrified melt matrix. The modal abundance of clasts is ~75 vol%. The matrix is fine-grained assemblage of 5 μm grains of olivine, pyroxene and feldspar (or feldspatic glass). The matrix consists of numerous scattered inclusions of troilite and FeNi metal. Accessory phase is chromite.

Northwest Africa 6148 (NWA 6148)
(Northwest Africa)
Purchased: 2009
Classification: Martian meteorite (Nakhlite)
History: Two stones that fit together (total 270 g) were purchased in Erfoud, Morocco, in 2009 by A. Aaronson.
Physical characteristics: Desert wind-ablated with little fusion crust, very friable.
Petrography: (T. Bunch and J. Wittke, *NAU*): Millimeter-sized euhedral augite and olivine (relative proportions, 85:15) set in a glassy mesostasis of dendritic pyroxenes, acicular Ti-magnetite, and small grains of silica, feldspar, and merrillite. Olivine and augite are strongly zoned. Weathering and shock are both low.
Geochemistry: Augite: cores, $Fs_{23.2}Wo_{42}$ (Fe/Mn=34); rims to $Fa_{41.5}Wo_{38.}$ Olivine: cores, $Fa_{64.5}$ (a few cores are more magnesian at Fa_{58}) (Fe/Mn=45); rims to $Fa_{74.5}$; mesostasis feldspar, $An_{12.3\text{-}16.7}Or_{5\text{-}12.}$
Classification: Martian (nakhlite). Possibly paired with NWA 5790.
Specimens: 20.1 g and one polished thin section are on deposit at *UWB*. The remaining material is held by Mr. P. Mani.

Northwest Africa 6258 (NWA 6258)
(Northwest Africa)
Purchased: 2009-May
Classification: Enstatite chondrite (EL melt rock)
History: Purchased by Marcin Cimala in May 2009 from a Moroccan dealer.
Physical characteristics: A group of dark brown, dense stones comprising two larger pieces and many small fragments (total 1088 g). Fresh interiors are black with abundant, anastomosing metal and sulfide grains.
Petrography: (A. Irving and S. Kuehner, *UWS*) Breccia composed of clasts rich in irregular, elongated grains of metal and sulfides with associated Fe-poor silicates. Minerals are forsterite, enstatite, diopside, albite, Si-poor kamacite, troilite, taenite, schreibersite, and daubreelite.
Geochemistry: Forsterite ($Fa_{0.9}$), enstatite ($Fs_{1.5\text{-}1.8}Wo_{1.4\text{-}1.2}$), diopside ($Fs_{0.7\text{-}2.3}Wo_{45.9\text{-}44.6}$).
Classification: EL-melt breccia.
Specimens: A total of 36 g of type material and one polished thin section are on deposit at *UWB*. The remaining material is held jointly by Mr. M. Cimala and Mr. T. Jakubowski.

Northwest Africa 6260 (NWA 6260)
(Northwest Africa)
Purchased: 2010 Apr
Classification: Ordinary chondrite (LL7)
History: Purchased in 2010 April by Hanno Strufe from a Moroccan dealer in Erfoud.
Physical characteristics: A single 1130 g greenish stone with partial fusion crust.
Petrography: (A. Irving and S. Kuehner, *UWS*) Poikiloblastic texture with no chondrules. Constituent minerals are olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, chlorapatite, altered kamacite and troilite.
Geochemistry: Olivine $Fa_{31.8\text{-}32.0}$, orthopyroxene $Fs_{25.1\text{-}25.3}Wo_{3.2\text{-}3.5}$, clinopyroxene $Fs_{12.7\text{-}13.3}Wo_{39.7\text{-}38.2.}$
Classification: Ordinary chondrite LL7. This specimen has a poikiloblastic texture with no chondrules but Fa range is consistent with LL.
Specimens: A total of 22.5 g of material and one polished thin section are on deposit at *UWB*. Mr. H. Strufe holds the main mass.

Northwest Africa 6301 (NWA 6301)
(Northwest Africa)
Purchased: 2009
Classification: HED achondrite (Eucrite, polymict)
Petrography: (A. Greshake, *MNB*): Polymict eucritic breccia composed of lithic fragments (basaltic lithologies, impact melt clasts) and mineral fragments (pyroxene, calcic plagioclase) set into a fine-grained clastic matrix. Pyroxene has fine exsolution lamellae. Minor phases include silica polymorphs, chromite, and rare FeNi metal.
Geochemistry: low Ca-pyroxene $Fs_{17.4\text{-}50.4}Wo_{1.2\text{-}3.6}$; Ca-pyroxene $Fs_{22.2\text{-}47.8}Wo_{7\text{-}43.2}$; calcic plagioclase $An_{90.2\text{-}96.2}$

Northwest Africa 6307 (NWA 6307)
(Northwest Africa)
Purchased: 2009
Classification: Mesosiderite
Petrography: (A. Greshake, *MNB*) The meteorite consists of approximately 60% silicates and 40% metal in a coarse-grained texture. Rounded metal grains are mostly kamacite. Silicates are low-Ca pyroxene and calcic plagioclase; no olivine was found. Minor phases include phosphates, troilite, and silica polymorphs.
Geochemistry: Calcic plagioclase: $An_{89.9\text{-}95.1}$

Northwest Africa 6309 (NWA 6309)
(Northwest Africa)
Purchased: 2009
Classification: HED achondrite (Eucrite, polymict)
Petrography: (A. Greshake, *MNB*): The grayish-whitish speckled rock is dominated by a coarse-grained basaltic lithology composed of pyroxene and mostly lath-shaped calcic plagioclase. Pyroxenes are mostly exsolved and frequently show cloudy appearance. Rare clasts are dark melt clasts. Minor minerals include chromite and pyrrhotite.
Geochemistry: low-Ca pyroxene: $Fs_{56.7\text{-}57.4}Wo_{5.9\text{-}6.3}$; Ca-pyroxene $Fs_{28\text{-}35.4}Wo_{32.7\text{-}42.1}$; calcic plagioclase $An_{90.1\text{-}91.8}$

Northwest Africa 6315 (NWA 6315)
(Northwest Africa)
Purchased: 2007
Classification: HED achondrite (Diogenite)
Petrography: (A. Greshake, *MNB*) The meteorite displays a grayish interior and is dominantly composed of blocky mm-sized orthopyroxene crystals. Minor phases are olivine, calcic plagioclase, chromite and FeNi metal.
Geochemistry: olivine: $Fa_{28.2}$; low-Ca pyroxene: $Fs_{23.4}Wo_{3.2}$; calcic plagioclase: $An_{88.2\text{-}93}$

Northwest Africa 6318 (NWA 6318)
(Northwest Africa)
Purchased: 2010
Classification: HED achondrite (Eucrite, polymict)
Petrography: (A. Greshake, *MNB*) Brecciated with abundant shock melt veins. The meteorite is composed of lithic and mineral clasts set in a clastic matrix; lithic clasts include basaltic clasts and dark impact melt fragments; mineral clasts are large plagioclase and exsolved pyroxenes. Contains accessory SiO_2 polymorphs, chromite, and troilite.
Geochemistry: low Ca-pyroxene $Fs_{58\text{-}58.5}Wo_{2.2\text{-}2.7}$; Ca-pyroxene $Fs_{24.4\text{-}25.2}Wo_{43.9\text{-}44.7}$; calcic plagioclase $An_{85.7\text{-}90.3}$

Northwest Africa 6325 (NWA 6325)
(Northwest Africa)
Purchased: 2009
Classification: HED achondrite (Eucrite, polymict)
Petrography: (A. Greshake, *MNB*) The grayish to light brownish colored rock consists of abundant clastic matrix supporting larger lithic and minerals clasts. Eucritic clasts show typical basaltic textures with lath-shaped plagioclase and exsolved pyroxene. Subrounded melt clast appears black in the bright matrix. Minor phases are chromite, FeNi metal and SiO_2 polymorphs.
Geochemistry: low-Ca pyroxene: $Fs_{51.8\text{-}55.6}Wo_{2.4\text{-}5.8}$; Ca-pyroxene $Fs_{24.9\text{-}47.9}Wo_{14.7\text{-}43.2}$; calcic plagioclase $An_{81.7\text{-}94.2}$

Northwest Africa 6348 (NWA 6348)
(Northwest Africa)
Purchased: 2010 Jul
Classification: Ordinary chondrite (L7)
History: Purchased in 2010 July by *Ralew* from a Moroccan dealer in Erfoud.
Physical characteristics: A single partly crusted gray stone with visible interior metal (134 g).
Petrography: (A. Irving and S. Kuehner, *UWS*) Patchy, recrystallized texture with regions of different grain size, which do not appear to be separate clasts. No chondrules are present, but some of the finer

grained regions may represent former chondrules. Constituent mineral are olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite, taenite and troilite.
Geochemistry: Olivine $Fa_{25.8-27.0}$, orthopyroxene $Fs_{19.7-22.3}Wo_{1.4-3.1}$, clinopyroxene $Fs_{10.5-10.6}Wo_{40.3-39.2}$.
Classification: Ordinary chondrite L7. This specimen is recrystallized with no chondrules but Fa range is consistent with L.
Specimens: A total of 20 g of material and one polished thin section are on deposit at *UWB*. *Ralew* holds the main mass.

Northwest Africa 6422 (NWA 6422)
Northwest Africa
Purchased: 2010 Sep
Classification: Ordinary chondrite (L3.6)
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed barred olivine, porphyritic olivine and radial pyroxene chondrules. Minerals are olivine, orthopyroxene, clinopyroxene, partially altered kamacite, chromite, troilite and taenite.
Geochemistry: Olivine ($Fa_{2.1-41.6}$; Cr_2O_3 in ferroan olivines = 0.02-0.06 wt.%, mean 0.05, s.d. 0.02, N = 6), orthopyroxene ($Fs_{3.5-23.7}Wo_{0.5-1.3}$), clinopyroxene ($Fs_{4.9}Wo_{45.8}$; $Fs_{18.8}Wo_{39.4}$).
Classification: Ordinary chondrite (L3.6). Subtype estimated to be 3.6 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 6425 (NWA 6425)
Northwest Africa
Purchased: 2010 Oct
Classification: Ordinary chondrite (LL3.5)
Petrography: (A. Irving and S. Kuehner, *UWS*) Large (1 mm), well-formed chondrules and sparse dark inclusions (one is a stained very fine grained chondrite) in a stained matrix. Minerals are olivine, orthopyroxene, subcalcic augite, augite, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{0.6-31.2}$, n=8. Cr_2O_3 in ferroan olivine = 0.02-0.08 wt.%, mean 0.06, s.d. 0.02, N = 6), orthopyroxene ($Fs_{1.8-24.7}Wo_{1.0-0.2}$), subcalcic augite ($Fs_{14.6}Wo_{28.4}$), augite ($Fs_{8.5}Wo_{44.2}$).
Classification: Ordinary chondrite (LL3.5). Subtype estimated from Cr_2O_3 distribution in ferroan olivine based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 6426 (NWA 6426)
(Northwest Africa)
Purchased: 2010 Oct
Classification: Ordinary chondrite (LL7)
History: Purchased in 2010 October by Jack Schrader from an anonymous dealer in Morocco.
Physical characteristics: A group of 16 identical gray stones partly coated by black fusion crust (total weight 361 g).
Petrography: (A. Irving and S. Kuehner, *UWS*) Breccia composed of clasts with a fine, recrystallized metamorphic texture. No chondrules are present. Constituent minerals are olivine, orthopyroxene, augite, sodic plagioclase, chromite, ilmenite, altered kamacite, chlorapatite, taenite (fresh, rounded grains) and troilite.
Geochemistry: Olivine $Fa_{32.0-33.6}$, orthopyroxene $Fs_{25.7-25.9}Wo_{2.5-2.0}$, augite $Fs_{11.3-12.2}Wo_{42.3-41.4}$). Oxygen isotopes (D. Rumble, *CIW*): analyses of acid-washed subsamples by laser fluorination gave, respectively $\delta^{17}O$ = 3.74, 3.68; $\delta^{18}O$ = 4.78, 4.72; $\Delta^{17}O$ = 1.227, 1.195 per mil.
Classification: Ordinary chondrite LL7. This specimen is recrystallized with no chondrules but Fa range and O isotopes are consistent with LL.
Specimens: A total of 20.1 g of material and one polished thin section are on deposit at *UWB*. Mr. J. Schrader holds the main masses.

Northwest Africa 6437 (NWA 6437)
Morocco
Found: 2009
Classification: Carbonaceous chondrite (CO3)
Petrography: Desert ablated stone with little fusion crust. Limonitic staining present. Typical CO chondrule size with small AOAs and CAIs. Olivine Fa mean, 21.4±18 (n=23), Fe/Mn=128 to 144, Cr_2O_3, mean = 31.4±15.4 wt % (n=23). Analyses limited to chondrule olivine only. Metal Ni = 5.6 wt %. Subtype of 3.1 likely based on Cr_2O_3 content in olivine (Grossman and Brearley, 2005).

Northwest Africa 6441 (NWA 6441)
(Northwest Africa)
Purchased: 2010
Classification: Ureilite
History: Purchased by F. Kuntz in December 2012 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Protogranular aggegate of olivine (with dark reduced rims), pigeonite and subcalcic augite.
Geochemistry: Olivine (core $Fa_{21.3\text{-}21.4}$, rim $Fa_{8.0\text{-}11.5}$), pigeonite ($Fs_{17.9\text{-}18.2}Wo_{5.4\text{-}5.5}$), subcalcic augite ($Fs_{3.1\text{-}9.0}Wo_{29.5\text{-}28.8}$).
Classification: Ureilite.
Specimens: Type specimen plus one polished thin section at *PSF*; main mass with *Kuntz*.

Northwest Africa 6451 (NWA 6451)
(Northwest Africa)
Purchased: 15 Jan 2009
Classification: Primitive achondrite (Brachinite)
History: Purchased by Alexandre Debienne in 2009 from a dealer in Morocco.
Physical characteristics: Partial individual with fusion crust.
Petrography: (A. Irving and S. Kuehner, *UWS*) Protogranular aggregate of predominantly olivine with subordinate clinopyroxene, chromite and kamacite.
Geochemistry: Olivine ($Fa_{30.6\text{-}30.7}$; FeO/MnO = 56-65), clinopyroxene ($Fs_{9.7\text{-}10.1}Wo_{44.1\text{-}43.3}$).
Classification: Achondrite (brachinite).
Specimens: 34.15 g is on deposit at *PSF*. The main mass is held by Alexandre Debienne.

Northwest Africa 6452 (NWA 6452)
(Northwest Africa)
Purchased: 2007 Jan
Classification: Carbonaceous chondrite (CV3)
History: Purchased by Alexandre Debienne in January 2007 from a dealer in Agadir, Morocco.
Physical characteristics: Two identical brownish stones of 586 g and 134 g.
Petrography: (A. Krot, *UHaw*) The specimen consists of irregularly shaped chondrules and CAI in a very fine-grained matrix composed of lath-shaped olivine, Fe-Ni sulfides, nepheline and pyroxenes.
Geochemistry: Olivine ($Fa_{0.6\text{-}61.5}$, N=50), orthopyroxene ($Fs_{0.7\text{-}3.6}Wo_{0.6\text{-}4.9}$, N=25).
Classification: Carbonaceous chondrite (CV3).
Specimens: A total of 52.2 g of type material is on deposit with *PSF*. The remaining material from both stones is held by Mr. A. Debienne.

Northwest Africa 6472 (NWA 6472)
Northwest Africa
Purchased: 2010 Oct
Classification: Ordinary chondrite (LL3.2)

Petrography: (A. Irving and S. Kuehner, *UWS*) Large well-formed chondrules in a more stained matrix. Minerals are olivine, orthopyroxene, subcalcic augite, augite, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{0.7-37.4}$, Cr_2O_3 in ferroan olivine = 0.11-0.47 wt.%, mean 0.23, s.d. 0.11, N = 8), orthopyroxene ($Fs_{3.8-19.9}Wo_{0.2-2.6}$), subcalcic augite ($Fs_{8.9}Wo_{28.2}$), augite ($Fs_{9.5}Wo_{38.4}$).
Classification: Ordinary chondrite (LL3.2). Subtype estimated to be 3.2 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 6473 (NWA 6473)
Northwest Africa
Purchased: 2010 Sep
Classification: Carbonaceous chondrite (CO3)
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh specimen composed of numerous small (<0.3 mm) chondrules in a dark matrix. Minerals are olivine, orthopyroxene, augite, chromite, kamacite and troilite.
Geochemistry: Olivine ($Fa_{0.7-61.1}$, Cr_2O_3 in ferroan olivine 0.10-0.35 wt.%, mean 0.19, s.d. 0.09, N = 7), orthopyroxene ($Fs_{1.3-33.3}Wo_{0.9-2.0}$), augite ($Fs_{1.0-1.1}Wo_{41.1-43.5}$).
Classification: Carbonaceous chondrite (CO3.2). Subtype estimated to be 3.2 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 5) in Grossman and Brearley (2005).

Northwest Africa 6479 (NWA 6479)
Northwest Africa
Purchased: 2010 Nov
Classification: Ordinary chondrite (LL3.5)
Petrography: (A. Irving and S. Kuehner, *UWS*) Large (to 1.1 mm), well-formed chondrules and sparse black inclusions (very fine grained) in a finer grained matrix. Minerals are olivine, orthopyroxene, subcalcic augite, augite, sodic plagioclase, chromite, altered kamacite and troilite. One grain of gehlenite (possibly derived from a CAI) was found.
Geochemistry: Olivine ($Fa_{1.0-59.0}$; Cr_2O_3 in ferroan olivine = 0.06-0.11 wt.%, mean 0.10, s.d. 0.02, N = 7), orthopyroxene ($Fs_{2.5-24.0}Wo_{0.2-2.4}$), subcalcic augite ($Fs_{13.1}Wo_{37.4}$), augite ($Fs_{9.1}Wo_{45.7}$).
Classification: Ordinary chondrite (LL3.5). Subtype estimated to be 3.5 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 6567 (NWA 6567)
(Northwest Africa)
Purchased: 2010 Nov
Classification: Carbonaceous chondrite (CV3)
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed chondrules (mostly granular with some PO) in a sparse black matrix. Some goethite veinlets formed by terrestrial weathering are present.
Geochemistry: Multiple pyroxenes identified by EMPA, e.g., $Fs_{5.1}Wo_{0.25}$, $Fs_{21.5}Wo_{6.4}$, $Fs_{8.1}Wo_{29.6}$, and $Fs_{1.6}Wo_{43.2}$. Olivine shows wide range $Fa_{0.4-24.8}$.

Northwest Africa 6568 (NWA 6568)
(Northwest Africa)
Purchased: 2010 Dec
Classification: HED achondrite (Eucrite, monomict)
Petrography: (A. Irving and S. Kuehner, *UWS*) Monomict feldspathic cumulate eucritic clasts plus related crystal debris (calcic plagioclase, exsolved pigeonite, silica, chromite, troilite, and Ni-poor kamacite). The specimen is cross-cut predominantly in one direction by veinlets of iron hydroxide produced by terrestrial weathering of primary metal.
Geochemistry: Orthopyroxene host $Fs_{42.0-43.4}Wo_{2.8-3.0}$, clinopyroxene lamellae $Fs_{18.9-19.8}Wo_{41.3-41.4}$.

Northwest Africa 6571 (NWA 6571)
(Northwest Africa)
Purchased: 2010 May
Classification: Carbonaceous chondrite (CV3)
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed ellipsoidal to irregular, granular chondrules (some with concentric dust rims) set in a very fine grained, dark brown, ferroan silicate and sulfide-rich matrix. The matrix contains sparse grains of pentlandite, Ni-bearing troilite, and taenite, as well as some small CAI composed of spinel and perovskite.

Northwest Africa 6574 (NWA 6574)
(Northwest Africa)
Purchased: 2010 Dec
Classification: HED achondrite (Diogenite, polymict)
Petrography: (A. Irving and S. Kuehner, *UWS*) Fragmental breccia containing lithic clasts of several different olivine-bearing diogenites and sparse (<10 vol. %) basaltic eucrites with related mineral debris and altered metal. The primary metal has been extensively weathered to produce veinlets of iron hydroxides that crosscut the specimen and cause it to break apart in fragments.

Northwest Africa 6577 (NWA 6577)
(Northwest Africa)
Purchased: 2011 Jan
Classification: HED achondrite (Eucrite, polymict)
Petrography: (A. Irving and S. Kuehner, *UWS*) Polymict breccia composed of lithic and mineral fragments derived mostly from basaltic and cumulate eucritic lithologies, plus sparse (<10 vol%) diogenitic orthopyroxene.
Geochemistry: Pyroxenes range from diogenitic ($Fs_{21.5}Wo_{2.4}$) to ferropigeonite ($Fs_{59.8}Wo_{19.0}$) to exsolved pigeonite composed of orthopyroxene host ($Fs_{59.3\text{-}61.2}Wo_{3.7\text{-}2.1}$) with clinopyroxene exolution lamellae ($Fs_{26.7\text{-}26.8}Wo_{43.4}$).

Northwest Africa 6631 (NWA 6631)
(Northwest Africa)
Purchased: 2011 Feb
Classification: Ordinary chondrite (L(LL)3)
Geochemistry: PMD fayalite in olivine = 83; petrologic type <3.5. Densely packed chondrules and chondrule fragments with small amounts of dark interchondrule matrix material. Mean chondrule size is about 800 μm with larger chondrules up to 3 mm.

Northwest Africa 6700 (NWA 6700)
(Northwest Africa)
Purchased: 2011 Jan
Classification: Carbonaceous chondrite (CK4)
Petrography: (A. Irving and S. Kuehner, *UWS*) Separated, well-formed chondrules (some with magnetite-rich rims). Olivine, orthopyroxene, clinopyroxene, intermediate plagioclase and Cr-bearing magnetite.
Geochemistry: Olivine $Fa_{28.2\text{-}28.3}$, orthopyroxene $Fs_{23.9\text{-}28.8}Wo_{0.8\text{-}0.5}$, augite $Fs_{8.6\text{-}9.7}Wo_{45.9\text{-}47.8.}$

Northwest Africa 6702 (NWA 6702)
(Northwest Africa)
Purchased: 2011 Jan
Classification: Carbonaceous chondrite (CV3)

Petrography: (A. Irving and S. Kuehner, *UWS*) Distributed ovoid, dust-rimmed, granular and BO chondrules in a fine grained deep brown matrix. Sparse CAI (one fine grained example is composed of Al-Ti-clinopyroxene, spinel and minor grossular).
Geochemistry: Olivine $Fa_{0.7\text{-}10.6}$; orthopyroxene $Fs_{2.5}Wo_{1.2}$; $Fs_{15.1}Wo_{0.5}$; clinopyroxene $Fs_{0.4}Wo_{52.6}$, $Fs_{0.8}Wo_{42.6.}$

Northwest Africa 6705 (NWA 6705)
(Northwest Africa)
Purchased: 2011 Mar
Classification: Angrite
Petrography: (A. Irving and S. Kuehner, *UWS*) Metamorphic texture. Olivine (FeO/MnO = 81-87) occurs as polycrystalline aggregates of polygonal grains with Al-Ti-rich clinopyroxene (pinkish in thin section; FeO/MnO = 82-90), kamacite, Cr-Al spinel (purplish-brown in thin section), troilite and rare pure anorthite (as thin coronas around spinel grains in contact with clinopyroxene). Other portions of this specimen contain angular anorthite clasts. Minor goethite from terrestrial weathering of metal is present on grain boundaries. This specimen is paired with NWA 2999, 3158, 3164, 4569, 4662, 4877, 4931 and 6291.

Northwest Africa 6717 (NWA 6717)
(Northwest Africa)
Purchased: 2010 Jan
Classification: Carbonaceous chondrite (CV3)
Petrography: (A. Irving and S. Kuehner, *UWS*) Fairly closely-packed chondrules (mostly granular, some irregular in shape, some rimmed, up to 1.2 mm) and rare fine grained CAI in a deep brown altered matrix.

Northwest Africa 6722 (NWA 6722)
Northwest Africa
Purchased: 2011 Feb
Classification: Ordinary chondrite (L3.5)
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, medium-sized (some to 0.7 mm) chondrules in a matrix containing stained metal. Minerals are olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite, Ni-bearing troilite and pentlandite.
Geochemistry: Olivine ($Fa_{13.7\text{-}36.8}$; Cr_2O_3 for ferroan olivine grains = 0.05 to 0.10 wt.%, mean 0.07, s.d. 0.02, N = 7), orthopyroxene ($Fs_{2.3\text{-}6.9}Wo_{0.4\text{-}0.7}$), clinopyroxene ($Fs_{3.1\text{-}6.5}Wo_{35.1\text{-}27.1}$).
Classification: Ordinary chondrite (L3.5). Subtype estimated to be 3.5 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 6726 (NWA 6726)
Northwest Africa
Purchased: 2011 Jan
Classification: Carbonaceous chondrite (CO3)
Petrography: (A. Irving and S. Kuehner, *UWS*) Small (typically <0.3 mm) chondrules are set within a relatively unaltered matrix containing taenite, troilite and rare kamacite.
Geochemistry: Olivine ($Fa_{0.5\text{-}39.1}$; Cr_2O_3 in ferroan olivine 0.10-0.35 wt.%, mean 0.19, s.d. 0.12, N = 9), orthopyroxene ($Fs_{3.1\text{-}9.1}Wo_{1.1\text{-}2.8}$), clinopyroxene ($Fs_{1.1\text{-}2.8}Wo_{37.3\text{-}38.6}$).
Classification: Carbonaceous chondrite (CO3.2). Subtype estimated to be 3.2 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 5) in Grossman and Brearley (2005).

Northwest Africa 6828 (NWA 6828)
(Northwest Africa)
Purchased: 2009

Classification: Rumuruti chondrite (R3-6)

Petrography: (A. Greshake, *MNB*) Breccia displaying a characteristic light-dark structure with heterogeneously distributed lithic fragments embedded in a fine-grained clastic matrix. The thin section studied contains about 20 vol% mostly angular clasts. R-type clasts are of type 3-6, the clastic matrix of type 3. Dark fragments are melt clasts. Opaque phases are chromite and FeNi-sulfides; metallic FeNi is very rare.

Geochemistry: Olivine in equilibrated lithologies: $Fa_{37.8}$; olivine in unequilibrated lithologies: $Fa_{0.3\text{-}57.8}$; low-Ca pyroxene in equilibrated lithologies: $Fs_{25.2}Wo_{1.6}$; low-Ca pyroxene in non-equilibrated lithologies: $Fs_{2.8\text{-}28.8}Wo_{0.3\text{-}4.1}$; olivine contains up to 0.14 wt% NiO.

Northwest Africa 6864 (NWA 6864)

Northwest Africa

Purchased: 2011 Apr

Classification: Ordinary chondrite (L3.15)

Petrography: (A. Irving and S. Kuehner, *UWS*) Medium sized (some to 0.8 mm), closely packed and well-formed chondrules. Minerals are olivine, orthopyroxene, pigeonite, subcalcic augite, sodic plagioclase, chromite, altered kamacite, and troilite.

Geochemistry: Olivine ($Fa_{0.5\text{-}45.8}$; Cr_2O_3 in ferroan olivine grains ranges from 0.12-0.45 wt.%, mean 0.28 wt.%, s.d. 0.09 wt.%, N = 15), orthopyroxene ($Fs_{2.3\text{-}33.6}Wo_{0.5\text{-}3.4}$), pigeonite ($Fs_{18.1}Wo_{17.6}$), subcalcic augite ($Fs_{28.4}Wo_{26.3}$). Oxygen isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{18}O$ 5.671, 6.062; $\delta^{17}O$ 3.649, 4.024; $\Delta^{17}O$ 0.662, 0.830 per mil.

Classification: Ordinary chondrite (L3.15). Subtype estimated to be 3.15 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on chart (Fig. 15a) in Grossman and Brearley (2005). L designation consistent with chondrule size, and O isotopes.

Northwest Africa 6866 (NWA 6866)

Northwest Africa

Purchased: 2011 Mar

Classification: Ordinary chondrite (H3.8)

Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed small (to 0.5 mm) POP, BO and RP chondrules in a finer matrix containing fairly abundant stained metal. Minerals are olivine, orthopyroxene, subcalcic augite, sodic plagioclase, troilite and altered kamacite.

Geochemistry: Olivine ($Fa_{11.5\text{-}22.1}$; Cr_2O_3 in ferroan olivine <0.02 wt.%), orthopyroxene ($Fs_{7.1\text{-}19.5}Wo_{0.5\text{-}1.7}$), subcalcic augite ($Fs_{14.9\text{-}17.0}Wo_{29.7\text{-}31.1}$). Selection of olivines for analysis guided by BSE imagery.

Classification: Ordinary chondrite (H3.8). Subtype estimated to be 3.8 based on undetectable Cr_2O_3 in ferroan olivine, fine-grained matrix, and relatively narrow range in Fa.

Northwest Africa 6867 (NWA 6867)

(Northwest Africa)

Purchased: 2011 Apr

Classification: Ordinary chondrite (LL3)

Petrography: (A. Irving and S. Kuehner, *UWS*) Unequilibrated specimen composed of relatively large (to 1 mm), well-formed chondrules in a fairly weathered matrix. Minerals are olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.

Geochemistry: Olivine ($Fa_{1.4\text{-}35.0}$; Cr_2O_3 in ferroan olivine 0.14-0.80 wt.%, mean 0.38 wt.%, s.d. 0.23 wt.%, N = 8), orthopyroxene ($Fs_{2.6\text{-}24.1}Wo_{0.2\text{-}1.5}$), clinopyroxene ($Fs_{3.3\text{-}10.4}Wo_{43.7\text{-}37.8}$). Oxygen isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{18}O$ 5.764, 5.547; $\delta^{17}O$ 3.618, 3.459; $\Delta^{17}O$ 0.582, 0.537 per mil.

Classification: Chondrite (LL3.1). Subtype estimated to be 3.1 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on chart (Fig. 15) in Grossman and Brearley (2005).

Northwest Africa 6869 (NWA 6869)
Northwest Africa
Purchased: 2009 Jun
Classification: Ordinary chondrite (H3.9)
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, small (to 0.55 mm) chondrules in a sparse, fine-grained, dark matrix. Minerals are olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, kamacite and troilite.
Geochemistry: Olivine ($Fa_{16.7\text{-}18.5}$, Cr_2O_3 in ferroan olivine < 0.02 wt.%), orthopyroxene ($Fs_{8.5\text{-}23.1}Wo_{0.1\text{-}2.9}$, $Fs_{44.5}Wo_{3.5}$), clinopyroxene ($Fs_{17.2\text{-}19.5}Wo_{36.7\text{-}36.3}$).
Classification: Ordinary chondrite (H3.9). Subtype estimated to be 3.9 based on undetectable Cr_2O_3 in ferroan olivine, fine-grained matrix, and narrow range in Fa.

Northwest Africa 6908 (NWA 6908)
Western Sahara
Found: 15 Mar 2010
Classification: Carbonaceous chondrite (CM2)
History: One dark, roundish, almost complete stone of 52.68 g was found by an anonymous finder on March 15, 2010, in Western Sahara.
Petrography: In thin section the rock is dark, similar to other carbonaceous chondrites. The dark opaque material makes up an estimated 70-80 vol%. The chondrite contains a low abundance of small complete chondrules. Chondrule and mineral fragments are the most abundant coarse-grained components, which are surrounded by typical fine-grained accretionary rims.
Geochemistry: Olivine, $Fa_{22\pm19}$ (range, $Fa_{0\text{-}70}$); pyroxene, $Fs_{15\pm20}$ (range, $Fs_{0\text{-}52}$). Oxygen isotope composition (A. Pack, *UGött*) $\delta^{18}O = 9.06$; $\delta^{17}O = 1.52$; $\Delta^{17}O = -3.232$ (all per mil).

Northwest Africa 6910 (NWA 6910)
Northwest Africa
Purchased: 2009 Sep
Classification: Ordinary chondrite (L3.3)
Petrography: (A. Irving and S. Kuehner, *UWS*) Well formed, fairly large (to 0.7 mm) closely packed chondrules in a very dark matrix containing a moderate amount of metal. Minerals are olivine, orthopyroxene, augite, subcalcic augite, sodic plagioclase, chromite, partly altered kamacite, troilite and taenite.
Geochemistry: Olivine ($Fa_{0.4\text{-}39.2}$; Cr_2O_3 in ferroan olivine = 0.02-0.33 wt.%, mean 0.12 wt.%, s.d. 0.12, N = 9), orthopyroxene ($Fs_{1.2\text{-}7.4}Wo_{0.5\text{-}0.6}$), augite ($Fs_{6.4}Wo_{36.1}$), subcalcic augite ($Fs_{21.0}Wo_{29.5}$).
Classification: Ordinary chondrite (L3.3). Subtype estimated to be 3.3 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 6921 (NWA 6921)
Northwest Africa
Purchased: 2011 Aug
Classification: CR6
History: Purchased by Adam Aaronson in Temara, Morocco in 2011 August.
Physical characteristics: A single fresh, pale greenish stone (1749 g) with patchy black fusion crust.
Petrography: (A. Irving and S. Kuehner, *UWS*) Predominantly poikiloblastic texture, but with rare small BO chondrules. There are some larger olivine grains, but most of the specimen is an aggregate of finer olivine, orthopyroxene, minor clinopyroxene, intermediate plagioclase, fresh kamacite, chromite, troilite, and merrillite.
Geochemistry: Olivine ($Fa_{37.5\text{-}37.9}$, FeO/MnO = 91), orthopyroxene ($Fs_{29.5\text{-}29.7}Wo_{2.9\text{-}3.3}$, FeO/MnO = 54-57), clinopyroxene ($Fs_{11.5\text{-}12.7}Wo_{44.5\text{-}43.8}$, FeO/MnO = 31-34). Oxygen isotopes (R. Tanaka, *OkaU*):

analyses of acid-washed subsamples by laser fluorination gave $\delta^{17}O$ = -0.280, -0.065; $\delta^{18}O$ = 2.788, 3.181; and $\Delta^{17}O$ = -1.747, -1.738 per mil.
Classification: Carbonaceous chondrite (CR6). This specimen is a highly equilibrated CR chondrite paired with NWA 2994, NWA 3250, NWA 6901 and NWA 7317.
Specimens: A total of 20.3 g of sample and one polished thin section are on deposit at *UWB*. *Aaronson* holds the main mass.

Northwest Africa 6922 (NWA 6922)
Northwest Africa
Purchased: 2011 May
Classification: Ordinary chondrite (LL3.6)
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively large (<1 mm), well-formed PO and RP chondrules in a fragmental matrix containing low amounts of altered metal. Minerals are olivine, orthopyroxene, pigeonite, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{5.5-33.2}$; Cr_2O_3 in ferroan olivine = 0.02-0.06 wt.%, mean 0.04, s.d. 0.01, N = 5), orthopyroxene ($Fs_{7.2-26.2}Wo_{0.1-1.0}$), pigeonite ($Fs_{20.6}Wo_{6.2}$; $Fs_{14.1}Wo_{17.3}$).
Classification: Ordinary chondrite (LL3.6). Subtype estimated to be 3.6 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 6924 (NWA 6924)
Northwest Africa
Purchased: 2011 Feb
Classification: Ordinary chondrite (LL3.4)
Petrography: (A. Irving and S. Kuehner, *UWS*) The majority of clasts are unequilibrated and contain large (to ~ 1mm), well-formed chondrules (which also are present as individual objects in the matrix). Several more equilibrated clasts were also observed (one Type 5 chondrite and one with completely recrystallized texture). Minerals are olivine, orthopyroxene, clinopyroxene, sodic plagioclase, altered kamacite, chromite, troilite and taenite.
Geochemistry: Olivine ($Fa_{9.6-43.7}$; Cr_2O_3 in ferroan examples is 0.02-0.21 wt.%, mean 0.06 wt.%, s.d. 0.08 wt.%, N =7), orthopyroxene ($Fs_{3.1-23.5}Wo_{0.2-0.5}$), clinopyroxene ($Fs_{8.1-10.1}Wo_{44.6-45.0}$).
Classification: Ordinary chondrite (LL3.4). Subtype of the unequilibrated clasts estimated to be 3.4 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 6925 (NWA 6925)
Northwest Africa
Purchased: 2011 Mar
Classification: Ordinary chondrite (L3.15)
Petrography: (A. Irving and S. Kuehner, *UWS*) Fairly large (to 0.7 mm), well formed and relatively closely packed chondrules in a matrix containing very ferroan silicates and moderate amounts of altered metal. Minerals are olivine, orthopyroxene, clinopyroxene, with accessory altered kamacite, troilite and taenite. A single grain of Al-Ti-diopside may be an exotic component related to CAI.
Geochemistry: Olivine ($Fa_{1.5-92.1}$; Cr_2O_3 in ferroan examples is 0.02-0.39 wt.%, mean 0.20 wt.%, s.d. 0.12 wt.%, N = 10), orthopyroxene ($Fs_{5.1}Wo_{0.3}$, $Fs_{16.3}Wo_{3.0}$), clinopyroxene ($Fs_{8.6}Wo_{45.4}$), Al-Ti-diopside ($Fs_{0.8}Wo_{56.9}$; Al_2O_3 19.2 wt.%, TiO_2 1.5 wt.%, FeO/MnO = 67). Oxygen isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{18}O$ 5.602, 5.529; $\delta^{17}O$ 4.062, 4.012; $\Delta^{17}O$ 1.110, 1.098 per mil.
Classification: Ordinary chondrite (L3.15). Subtype estimated to be 3.15 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on chart (Fig. 15a) in Grossman and Brearley (2005).

Northwest Africa 6930 (NWA 6930)

Northwest Africa
Purchased: 2011 Jun
Classification: Ordinary chondrite (H3.8)

Petrography: (A. Irving and S. Kuehner, *UWS*) Small (to 0.5 mm), well-formed chondrules and fairly abundant slightly stained metal. Matrix is unrecrystalllized and fine-grained. Minerals are olivine, orthopyroxene, subcalcic augite, augite, sodic plagioclase, kamacite, chromite, merrillite and troilite.
Geochemistry: Olivine ($Fa_{15.3-28.2}$; Cr_2O_3 in ferroan olivine <0.02 wt.%), orthopyroxene ($Fs_{1.9}Wo_{0.7}$; $Fs_{16.4}Wo_{1.2}$), subcalcic augite ($Fs_{13.5}Wo_{31.1}$), augite ($Fs_{4.1}Wo_{42.4}$).
Classification: Ordinary chondrite (H3.8). Subtype estimated to be 3.8 based on undetectable Cr_2O_3 in ferroan olivine, fine-grained matrix, and narrow range in Fa.

Northwest Africa 6933 (NWA 6933)
(Northwest Africa)
Purchased: 2010
Classification: HED achondrite (Eucrite)

Petrography: (K. Metzler, *IfP*) Coarse-grained eucritic clasts with ophitic to subophitic textures and mineral fragments (pyroxene, plagioclase, silica polymorph) set in a dark gray matrix. The matrix represents a crystallized melt with subophitic texture consisting of pyroxene and skeletal plagioclase crystals. Lithic clasts and mineral fragments are strongly recrystallized. Some pyroxene fragments contain Fe-rich olivine veins. Accessories are ilmenite, troilite, and metal (mostly oxidized). Calcite veins occur.
Geochemistry: Plagioclase compositions: $An_{89.1\pm2.0}$ (85-93; n=15). Olivine veins: $Fa_{75.}$
Classification: Eucritic melt rock

Northwest Africa 6943 (NWA 6943)
(Northwest Africa)
Purchased: 2011 Jun 22
Classification: HED achondrite (Eucrite, polymict)

Petrography: (K. Metzler, *IfP*) Polymict breccia consisting of eucritic lithic clasts with ophitic, subophitic and granulitic textures and mineral fragments (pyroxene, plagioclase) set in a fine-grained light gray matrix. Most pyroxenes exhibit augite exsolution lamellae. Three Fe-rich olivines were found. Accessories are silica, ilmenite, chromite, troilite, and Ni-poor metal. Shock veins occur.
Geochemistry: Plagioclase compositions: $An_{90.5}$?2.7 (85-95; n=19.)
Classification: Polymict eucrite

Northwest Africa 6945 (NWA 6945)
(Northwest Africa)
Purchased: 2010 May
Classification: HED achondrite (Diogenite, polymict)

History: Purchased by *Kuntz* from a Moroccan dealer in May 2010.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fragmental breccia composed of >90% angular diogenitic orthopyroxene, some calcic plagioclase, sparse exsolved pigeonite and rare olivine grains in a finer matrix. Several clasts (up to 5 mm across) are noritic diogenite, composed of ~80 vol.% orthopyroxene and ~20 vol.% anorthite with accessory Ti chromite, fine Ni-free metal and troilite.
Geochemistry: Orthopyroxene grains (cores $Fs_{23.0-24.0}Wo_{2.3-2.0}$; rim $Fs_{41.3}Wo_{2.4}$), orthopyroxene in noritic clast ($Fs_{36.7-37.2}Wo_{4.0-2.7}$), exsolved pigeonite (orthopyroxene host $Fs_{53.1}Wo_{2.8}$, augite lamella $Fs_{23.3}Wo_{41.6}$), olivine grains ($Fa_{43.3-43.6}$), augite grain ($Fs_{6.0}Wo_{43.7}$).
Classification: Achondrite (diogenite, polymict).
Specimens: The main mass is held by *Kuntz*. A total of 24 g of material and one polished thin section are on deposit at *PSF*.

Northwest Africa 6954 (NWA 6954)

Northwest Africa
Purchased: 2011 Aug
Classification: Ordinary chondrite (L3.6)

Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, medium-sized chondrules. Minerals are olivine, orthopyroxene, clinopyroxene, sodic plagioclase, altered kamacite, chromite, troilite and taenite.
Geochemistry: Olivine ($Fa_{0.7\text{-}39.3}$; Cr_2O_3 in ferroan examples is 0.02-0.09 wt.%, mean 0.03 wt.%, s.d. 0.03 wt.%, N = 8), orthopyroxene ($Fs_{2.1\text{-}24.7}Wo_{0.3\text{-}1.3}$), clinopyroxene ($Fs_{17.5}Wo_{27.1}$; $Fs_{7.3}Wo_{45.1}$).
Classification: Ordinary chondrite (L3.6). Subtype estimated to be 3.6 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 6957 (NWA 6957)
(Northwest Africa)
Purchased: 2011 Aug
Classification: Carbonaceous chondrite (CR2)

History: Purchased by Gary Fujihara from a dealer in Erfoud, Morocco in 2011 August.
Petrography: (A. Irving and S. Kuehner, *UWS*) Separated chondrules with prominent rims of altered kamacite (plus some troilite) set in a dark-brown matrix rich in cronstedtite-tochilinite. Minerals are olivine, enstatite, Cr-Al-bearing diopside, altered kamacite and troilite.
Geochemistry: Olivine (predominantly highly magnesian $Fa_{1.2\text{-}5.2}$, but there are compositions as ferroan as $Fa_{67.4}$ in the matrix), enstatite ($Fs_{1.3\text{-}1.8}Wo_{0.6\text{-}4.6}$), diopside ($Fs_{3.0}Wo_{39.1}$; $Fs_{1.2}Wo_{42.9}$). Oxygen isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{17}O$ = -2.642, -3.316; $\delta^{18}O$ = 0.355, -0.505; $\Delta^{17}O$ = -2.832, -3.055 per mil.
Classification: Carbonaceous chondrite (CR2). The O isotopes together with the low Fa range and presence of cronstedtite-tochilinite make this consistent with a CR.

Northwest Africa 6958 (NWA 6958)
(Northwest Africa)
Purchased: 2011 Jun
Classification: Ordinary chondrite (LL7)

History: Purchased in 2011 June by *GHupé* from a Moroccan dealer at the St. Marie-aux-Mines Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Poikiloblastic texture. Tiny pyroxene, sodic plagioclase and troilite grains are enclosed within larger olivine poikiloblasts, and grains of metal (both kamacite and taenite) and chromite have "holly-leaf" shapes. No chondrules can be discerned,
Geochemistry: Olivine ($Fa_{29.1\text{-}29.9}$), orthopyroxene ($Fs_{23.4\text{-}23.5}Wo_{3.5\text{-}4.1}$), clinopyroxene ($Fs_{10.0\text{-}12.0}Wo_{43.5\text{-}38.4}$).
Classification: Ordinary chondrite LL7. This specimen has a poikiloblastic texture with no chondrules.
Specimens: 13.3 g of type material and one polished thin section are on deposit at *UWB*. The remaining material is held by *GHupé*.

Northwest Africa 6960 (NWA 6960)
(Northwest Africa)
Purchased: 2011 Jun
Classification: Ordinary chondrite (type 3)

History: Purchased by *GHupé* in June 2011 from a Moroccan dealer at the St. Marie-aux-Mines Mineral Show.
Physical characteristics: Very fresh dark gray stone (441 g) with white to beige (and some dark) chondrules, pale angular grains and low amounts of fresh metal.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed chondrules of varying sizes (some in the size range for LL chondrites, others much smaller). Some chondrules have pyrrhotite-rich rims and others have fine grained dust rims. Large angular olivine grains also are present, and one unusual clast composed of pigeonite+anorthite was found. Olivine ($Fa_{0.5\text{-}49.5}$; Cr_2O_3 in ferroan olivine ranges from 0.03-0.20 wt.%,

mean 0.14, s.d. 0.05, N = 9), orthopyroxene ($Fs_{1.0-16.9}Wo_{0.6-3.2}$), pigeonite ($Fs_{22.2-35.4}Wo_{8.0-5.9}$). Pyrrhotite occurs as an accessory mineral in the matrix, but kamacite and taenite are both minor constituents.
Geochemistry: Olivine ($Fa_{0.5-49.5}$; Cr_2O_3 in ferroan olivine ranges from 0.03-0.20 wt.%, mean 0.14, s.d. 0.05, N = 9), orthopyroxene ($Fs_{1.0-16.9}Wo_{0.6-3.2}$), pigeonite ($Fs_{22.2-35.4}Wo_{8.0-5.9}$). Oxygen isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{18}O$ 5.236, 4.596; $\delta^{17}O$ 3.330, 2.935; $\Delta^{17}O$ 0.572, 0.514 per mil.
Classification: Chondrite (OC3, Type 3.4). Although oxygen isotopic compositions plot near the field for L chondrites, this very fresh specimen has far too little metal (around 2 vol.%), and some of the chondrules are too large, for this to be an L chondrite. Subtype estimated to be 3.4 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 7005 (NWA 7005)
Northwest Africa
Purchased: 2011 Sep
Classification: Carbonaceous chondrite (CO3)
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed small (to 0.3 mm) chondrules. Olivine, orthopyroxene, with accessory clinopyroxene, calcic plagioclase, troilite, pentlandite, taenite and altered kamacite. Some rounded composite metal+sulfide aggregates. Sparse small CAI composed of fine grained spinel, with varying amounts of Mg-ilmenite, grossite and corundum; some CAI have Wark-Lovering rims composed of sodalite and wollastonite.
Geochemistry: Olivine ($Fa_{0.9-37.5}$; Cr_2O_3 in ferroan olivine 0.02-0.06 wt.%, mean 0.04, s.d. 0.02, N = 5), orthopyroxene ($Fs_{1.2-9.0}Wo_{0.8-2.9}$), clinopyroxene ($Fs_{1.3}Wo_{39.0}$; $Fs_{18.1-18.4}Wo_{46.3-47.5}$).
Classification: Carbonaceous chondrite (CO3.6). Subtype estimated to be 3.6 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 5) in Grossman and Brearley (2005).

Northwest Africa 7006 (NWA 7006)
Northwest Africa
Purchased: 2011 Sep
Classification: Carbonaceous chondrite (CO3)
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed small (most below 0.3 mm) chondrules, olivine and orthopyroxene mineral fragments and rare CAI in a reddish-brown matrix containing minor clinopyroxene, kamacite and troilite.
Geochemistry: Olivine ($Fa_{0.4-38.6}$; Cr_2O_3 contents in ferroan olivine 0.02-0.04 wt.%, mean 0.03, s.d. 0.01, N = 5), orthopyroxene ($Fs_{4.2-5.7}Wo_{0.8-0.4}$), clinopyroxene ($Fs_{1.4}Wo_{37.0}$; $Fs_{1.0}Wo_{42.6}$).
Classification: Carbonaceous chondrite (CO3.6). Subtype estimated to be 3.6 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 5) in Grossman and Brearley (2005).

Northwest Africa 7019 (NWA 7019)
(Northwest Africa)
Purchased: 2011 Feb
Classification: Ordinary chondrite (L, melt rock)
History: Purchased by *Reed* from a Moroccan dealer at the Tucson Gem and Mineral Show in February 2011.
Petrography: (A. Irving and S. Kuehner, *UWS*) Extremely fine grained quenched melt texture with larger irregular metal grains; no chondrules.
Geochemistry: Olivine ($Fa_{23.5-24.0}$), orthopyroxene ($Fs_{18.7-19.5}Wo_{2.8-1.6}$), subcalcic augite ($Fs_{15.5-15.8}Wo_{28.5-25.1}$).
Classification: Ordinary chondrite (L-melt rock).
Specimens: The main mass is held by *Reed*. A total of 26.6 g of material and one polished thin section are on deposit at *PSF*.

Northwest Africa 7020 (NWA 7020)
(Northwest Africa)
Purchased: 2011 Feb
Classification: Carbonaceous chondrite (CR2)
History: Purchased by Blaine Reed from a Moroccan dealer at the Tucson Gem and Mineral Show in February 2011.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fairly closely-packed, medium-sized (typically 0.4 to 0.7 mm) chondrules and rare fine-grained CAI in a red to brown stained matrix containing kamacite, pentlandite and possible cronstedtite-tochilinite (based on EMPA spectra). Some chondrules are partially rimmed by kamacite. CAI contain spinel partially rimmed by gehlenite and rare Al-diopside.
Geochemistry: Olivine ($Fa_{1.8\text{-}58.1}$, n=8, Cr_2O_3 in ferroan olivine 0.34-0.42 wt.%, n=6), orthopyroxene ($Fs_{1.3\text{-}1.5}Wo_{0.7\text{-}0.9}$), subcalcic augite ($Fs_{4.6}Wo_{28.5}$), augite ($Fs_{1.6\text{-}3.3}Wo_{44.1\text{-}39.2}$). Oxygen isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{17}O$ -2.101, -3.022; $\delta^{18}O$ 1.026, -0.014; $\Delta^{17}O$ -2.643, -3.019.
Classification: Carbonaceous chondrite (CR2).
Specimens: The main mass is held by *Reed*. A total of 22.8 g of material and one polished thin section are on deposit at *PSF*.

Northwest Africa 7024 (NWA 7024)
(Northwest Africa)
Purchased: 2011 Apr
Classification: Ordinary chondrite (H7)
History: Purchased by Stefan Ralew from a dealer in Erfoud, Morocco, in 2011 April.
Petrography: (A. Irving and S. Kuehner, *UWS*) Metamorphic texture with triple grain junctions among olivine, orthopyroxene, sodic plagioclase, altered kamacite, chromite and troilite. No clinopyroxene or phosphates were found.
Geochemistry: Olivine ($Fa_{17.9\text{-}18.0}$), orthopyroxene ($Fs_{16.0\pm0.0}Wo_{3.0\text{-}3.2}$). Oxygen isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{17}O$ 2.796, 2.874; $\delta^{18}O$ 4.191, 4.294; $\Delta^{17}O$ 0.588, 0.612 per mil.
Classification: Ordinary chondrite H7. This specimen has affinities with H chondrites, but recrystallization has been so extensive that all minerals have triple grain junctions.
Specimens: 16 g of type material and one polished thin section are on deposit at *UWB*. The remaining material is held by *Ralew*.

Northwest Africa 7025 (NWA 7025)
(Northwest Africa)
Purchased: 2011 Apr
Classification: Mesosiderite
History: Purchased by *Ralew* from a dealer in Erfoud, Morocco in 2011 April.
Petrography: (A. Irving and S. Kuehner, *UWS*) The specimen contains two distinct domains in contact along curvilinear boundaries. One lithology consists predominantly of orthopyroxene with subordinate anorthite, ~25 vol.% troilite+metal (kamacite and taenite as small cuspate grains), accessory chromite and merrillite. Other portions of the specimen have similar mineralogy, except that most of the troilite and metal has been replaced by small cuspate voids.
Geochemistry: Orthopyroxene ($Fs_{26.3\text{-}26.5}Wo_{2.9\text{-}3.1}$, FeO/MnO = 26-28). Oxygen isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{17}O$ 1.961, 1.847, 2.082; $\delta^{18}O$ 4.149, 3.992, 4.387; $\Delta^{17}O$ -0.223, -0.255, -0.228 per mil.
Classification: Mesosiderite. Parts of this specimen have mineralogy, mineral compositions and an oxygen isotopic composition consistent with mesosiderites, but other parts with the same silicate mineralogy have voids in place of former troilite and metal (probably indicative of selective terrestrial weathering).

Northwest Africa 7027 (NWA 7027)
Morocco
Purchased: 2010
Classification: Carbonaceous chondrite (CO3.1)
History: Purchased by Blaine Reed in September, 2010.
Physical characteristics: Single stone, dark brown weathered fusion crust, saw-cut reveals many small chondrules in a fine-grained, dark brown matrix.
Petrography: Microprobe examination of a polished mount shows numerous porphyritic chondrules many ~100 µm in diameter with range of ~50-500 µm. Glassy chondrule mesostasis, and ubiquitous opaque grain boundary matrix, sulfide-rich, also some irregularly shaped chondrules.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Random chondrule olivine range $Fa_{0.5\text{-}38.1}$, mean=$Fa_{11.5}$, n=35, chondrule ferroan olivine mean $Fa_{17.1\pm12.5}$, Cr_2O_3=0.20±0.11 wt%, Fe/Mn=88±71, n=23; enstatite $Fs_{3.5\pm2.1}Wo_{2.0\pm2.0}$, n=8; aluminous diopside $Fs_{2.7\pm1.9}Wo_{53.9\pm5.8}$, Al_2O_3=13.43±6.23 wt%.
Classification: Carbonaceous chondrite (CO3.1) based on mean Cr_2O_3=0.20±0.11 wt% in chondrule ferroan olivines which is approximately midway between Colony CO3.0 (Cr_2O_3=0.36±0.10 wt%) and Rainbow CO3.2 (Cr_2O_3=0.08±0.05 wt%), Grossman and Brearley (2005).
Specimens: 40 g including a probe mount on deposit at *UNM*, Blaine *Reed* holds the main mass.

Northwest Africa 7029 (NWA 7029)
Morocco
Purchased: 2009
Classification: Ordinary chondrite (LL3.10)
History: Purchased by Blaine Reed in Denver, 2009.
Physical characteristics: Single stone, weathered exterior, saw cut surface reveals numerous densely packed chondrules (200-4000 µm) set in a dark brown matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous porphyritic chondrules with igneous zoned olivines and pyroxenes, also BO and cryptocrystalline chondrules, opaque matrix present. Troilite, kamacite, taenite, Cl-rich apatite.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Olivine range $Fa_{1.0\text{-}34.0}$; mean values for ferroan olivine $Fa_{17.5\pm9.8}$, Fe/Mn=45±22, Cr_2O_3=0.24±0.19, n=26; low-Ca pyroxene $Fs_{13.4\pm11.2}Wo_{2.1\pm3.4}$, Fe/Mn=19±9, n=19, high-Ca pyroxene $Fs_{4.3}Wo_{33.0}$, n=1.
Classification: Ordinary chondrite (LL3.10), type 3.10 based on mean value and sigma of Cr_2O_3 in ferroan olivine after the method of Grossman and Brearley (2005).
Specimens: 20.6 g including a probe mount on deposit at *UNM*, *Reed* holds the main mass.

Northwest Africa 7031 (NWA 7031)
(Northwest Africa)
Purchased: 2011 Jul
Classification: Ordinary chondrite (LL3)
History: Purchased by Yinan Wang from Michael Cottingham in July 2011.
Physical characteristics: Very fresh specimen consisting of abundant closely-packed, pale colored, small- to medium-sized (to 0.5 mm) chondrules with very sparse black matrix.
Petrography: (A. Irving and S. Kuehner, *UWS*) Closely-packed round chondrules in a very sparse fine grained matrix. Very low content of kamacite as isolated fresh grains.
Geochemistry: Olivine ($Fa_{2.8\text{-}47.4}$), orthopyroxene ($Fs_{2.8\text{-}36.5}Wo_{0.3\text{-}1.5}$).
Classification: Chondrite (LL3). This fresh specimen has much less metal and smaller chondrules than in typical LL chondrites, and has many similarites to NWA 5717.
Specimens: The main mass is held jointly by Mr. Y. Wang and Mr. B. *Reed*. A total of 20.1 g of material is on deposit at *PSF*.

Northwest Africa 7038 (NWA 7038)
Northwest Africa
Purchased: 2011 Nov
Classification: Ordinary chondrite (L3.5)
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, medium-sized (to 0.65 mm) chondrules. Minerals are olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, troilite and altered kamacite.
Geochemistry: Olivine ($Fa_{2.1-41.6}$; Cr_2O_3 in ferroan olivines = 0.06-0.15 wt.%, mean 0.10, s.d. 0.04, N = 7), orthopyroxene ($Fs_{3.5-23.7}Wo_{0.5-1.3}$) , clinopyroxene ($Fs_{4.9}Wo_{45.8}$; $Fs_{18.8}Wo_{39.4}$).
Classification: Ordinary chondrite (L3.5). Subtype estimated to be 3.5 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 7039 (NWA 7039)
(Northwest Africa)
Purchased: 2012 Jan
Classification: HED achondrite (Diogenite)
History: Purchased by *GHupé* in 2012 February from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Composed mainly of preferentially oriented tabular grains of orthopyroxene with minor olivine, clinopyroxene, anorthite, chromite, troilite and Ni-free metal. Orthopyroxene grains contain tiny inclusions of chromite (some bladed) oriented parallel to prominent cleavages.
Geochemistry: Orthopyroxene ($Fs_{25.3-25.4}Wo_{2.9-2.3}$, FeO/MnO = 29-31), clinopyroxene ($Fs_{8.9-9.2}Wo_{45.4-44.4}$, FeO/MnO = 19-22), olivine ($Fa_{29.7}$, FeO/MnO = 51).
Classification: Diogenite. The foliated texture of tabular orthopyroxene grains is very unusual.

Northwest Africa 7058 (NWA 7058)
(Northwest Africa)
Purchased: 2006
Classification: Ureilite
History: Purchased by David Gregory and subsequently donated to *ROM* and *NHM*.
Physical characteristics: One piece, pebbly, wind-polished exterior, no remnant fusion crust, low weathering, minor caliche.
Petrography: (C. Smith, *NHM*) A typical textured ureilite consisting of mm-sized olivine with minor pyroxene, interstitial C-rich veins and masses and interstitial metal, most of which is oxidized. Olivine grains show clear reduction rims, with significant reduction occurring adjacent to C-rich masses.
Geochemistry: Olivine cores: $Fa_{20.2}$ (Range $Fa_{19.83-20.40}$, N=49). Cr_2O_3 0.67-0.80, MnO 0.44-0.44, CaO 0.30-0.36 (all wt%). Pyroxene cores $Fs_{17.5}Wo_{6.3}$ (Range $Fs_{16.1-19.3}Wo_{5.7-6.5}$, n=49), Cr_2O_3 1.1-1.15 wt%.
Classification: Achondrite (ureilite)
Specimens: Main mass, *ROM*. 50.12 g plus one thin section and two polished blocks at *NHM*.

Northwest Africa 7059 (NWA 7059)
(Northwest Africa)
Purchased: 2008 Feb
Classification: Ureilite
History: Purchased by David Gregory at the Tucson Gem and Mineral Show in February 2008 and donated to the Royal Ontario Museum.
Petrography: (A. Irving and S. Kuehner, *UWS*) Coarse-grained, protogranular assemblage of olivine and pigeonite. Olivine exhibits dark, more magnesian rims containing abundant blebby metallic iron.
Geochemistry: Olivine (cores $Fa_{21.1-21.7}$; rims $Fa_{10.3-11.4}$; Cr_2O_3 = 0.6-0.9 wt.%), pigeonite ($Fs_{17.2-17.7}Wo_{7.4-7.3}$).

Classification: Ureilite
Specimens: 27 g of sample and one polished thin section are on deposit at *UWB*. The main mass is held by *ROM*.

Northwest Africa 7118 (NWA 7118)
Northwest Africa
Purchased: 2011 Nov
Classification: Ordinary chondrite (L3.5)
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, closely packed medium-sized chondrules. Minerals are olivine, orthopyroxene, subcalcic augite, augite , sodic plagioclase, chromite, troilite and stained kamacite.
Geochemistry: Olivine ($Fa_{0.4\text{-}53.9}$; Cr_2O_3 in ferroan olivines = 0.07-0.16 wt.%, mean 0.12, s.d. 0.03, N = 8), orthopyroxene ($Fs_{1.9\text{-}22.6}Wo_{0.5\text{-}3.4}$), subcalcic augite ($Fs_{19.1}Wo_{31.8}$), augite ($Fs_{15.3}Wo_{38.6}$).
Classification: Ordinary chondrite (L3.5). Subtype estimated to be 3.5 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).

Northwest Africa 7124 (NWA 7124)
(Northwest Africa)
Purchased: 2011 Feb
Classification: HED achondrite (Eucrite)
History: Purchased by *Reed* in 2011 February from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fragmental breccia composed mainly of crystal debris derived from gabbroic eucrites (pigeonite, exsolved pigeonite, calcic plagioclase, silica polymorph, chromite and troilite). Isolated grains of altered metal (kamacite+taenite) associated with Ni-bearing troilite also are present, and the specimen is cross-cut by veinlets of goethite.
Geochemistry: Pigeonite ($Fs_{39.6\text{-}39.8}Wo_{11.0\text{-}10.5}$, FeO/MnO = 26-30), orthopyroxene host ($Fs_{48.5}Wo_{2.1}$, FeO/MnO = 25), clinopyroxene exsolution lamella ($Fs_{21.1}Wo_{42.3}$, FeO/MnO = 28).
Classification: Eucrite. The high content of altered metal is very unusual.

Northwest Africa 7126 (NWA 7126)
(Northwest Africa)
Purchased: 2011 June
Classification: Ureilite
History: Purchased by *Kuntz* from a Moroccan dealer at the Ensisheim Mineral Show in June 2011.
Petrography: (A. Irving and S. Kuehner, *UWS*) Aggregate of olivine (exhibiting reduced, metal-bearing rims) and pigeonite.
Geochemistry: Olivine (cores $Fa_{18.4\pm0.0}$, rim $Fa_{8.4}$), pigeonite ($Fs_{14.8\text{-}14.9}Wo_{7.6\text{-}7.5}$).
Classification: Achondrite (ureilite).
Specimens: The main mass is held by *Kuntz*. A total of 24.1 g of material is on deposit at *PSF*.

Northwest Africa 7127 (NWA 7127)
(Northwest Africa)
Purchased: 2011 Aug
Classification: HED achondrite (Howardite)
History: Purchased by Gary Fujihara in 2011 August from a Moroccan dealer.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh fragmental breccia composed of lithic clasts and crystal debris from basaltic eucrites and diogenites. Eucrite clasts consist of exsolved pigeonite, ferroan augite, calcic plagioclase, silica polymorph, ilmenite, chromite, troilite and minor metal.

Geochemistry: Diogenitic orthopyroxene ($Fs_{23.3}Wo_{1.9}$, FeO/MnO = 30), exsolved eucritic pigeonite (orthopyroxene host $Fs_{58.1\text{-}59.6}Wo_{4.9\text{-}6.8}$, FeO/MnO = 34; clinopyroxene exsolution lamella $Fs_{26.9}Wo_{42.3}$, FeO/MnO = 36), more ferroan augite ($Fs_{33.1}Wo_{38.9}$, FeO/MnO = 34).
Classification: Howardite.

Northwest Africa 7183 (NWA 7183)
(Northwest Africa)
Purchased: 2007 Sep
Classification: HED achondrite (Diogenite, polymict)
History: Purchased by *Twelker* in 2007 September from a Moroccan dealer at the Denver Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very fresh fragmental breccia consisting predominantly of angular diogenitic orthopyroxene grains (up to 2 mm across) plus <10 vol.% basaltic eucrite clasts and one finer-grained fragmental breccia clast. Minerals are orthopyroxene, exsolved pigeonite, calcic plagioclase, chromite, ilmenite and troilite.
Geochemistry: Orthopyroxene ($Fs_{17.1}Wo_{1.1}$; $Fs_{26.8}Wo_{2.6}$; FeO/MnO = 27-30) , exsolved pigeonite (orthopyroxene host $Fs_{49.7\pm0.0}Wo_{1.8\text{-}4.0}$, FeO/MnO = 32-33; clinopyroxene lamellae $Fs_{25.5\text{-}28.7}Wo_{39.6\text{-}38.5}$, FeO/MnO = 27).
Classification: Polymict diogenite.

Northwest Africa 7184 (NWA 7184)
(Northwest Africa)
Purchased: 2009 Oct
Classification: Carbonaceous chondrite (CR2)
History: Purchased by *Twelker* in 2011 August from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed medium-sized (0.3 to 0.7 mm) chondrules in a dark-brown, fine-grained matrix containing hydrous minerals (including cronstedtite), Ni-bearing sulfides and rare chlorapatite. Olivine, orthopyroxene, pigeonite, augite, chromite and troilite.
Geochemistry: Olivine ($Fa_{1.5\text{-}51.5}$; Cr_2O_3 in ferroan olivine 0.06-0.38 wt.%, mean 0.20 wt.%, s.d. 0.13 wt.%, N = 8), orthopyroxene ($Fs_{2.6}Wo_{0.3}$), pigeonite ($Fs_{27.3}Wo_{14.5}$), augite ($Fs_{15.2}Wo_{45.6}$). Oxygen isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{17}O$ = 0.33, 0.84; $\delta^{18}O$ = 4.12, 4.74; $\Delta^{17}O$ = -1.844, -1.652 per mil
Classification: Carbonaceous chondrite (CR2).

Northwest Africa 7188 (NWA 7188)
(Northwest Africa)
Purchased: 2011 Sep
Classification: HED achondrite (Eucrite)
History: Purchased by *Twelker* in 2011 September from a Moroccan dealer at the Denver Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh unbrecciated specimen with intersertal texture composed of exsolved pigeonite, calcic plagioclase, silica polymorph, ilmenite and troilite.
Geochemistry: Clinopyroxene lamellae ($Fs_{30.0\text{-}31.3}Wo_{39.6\text{-}39.1}$, FeO/MnO = 32) in host low-Ca pyroxene ($Fs_{57.1\text{-}57.9}Wo_{6.5\text{-}8.0}$, FeO/MnO = 33-35).
Classification: Basaltic eucrite (unbrecciated).

Northwest Africa 7193 (NWA 7193)
(Northwest Africa)
Purchased: 2012 Jan
Classification: HED achondrite (Eucrite, anomalous)
History: Purchased by *GHupé* in 2012 January from a Moroccan dealer at the Tucson Gem and Mineral Show.

Petrography: Fresh clast-rich breccia consisting of large clasts of medium-grained, ophitic to intersertal diabasic eucrite within a very sparse fragmental matrix. The clasts are composed of prismatic, complexly-zoned pyroxene, calcic plagioclase laths, fayalitic olivine, ilmenite, iron sulfide, Ni-free metal and regions of dark mesostasis.
Geochemistry: Orthopyroxene cores ($Fs_{29.0}Wo_{4.6}$; FeO/MnO = 28), pigeonite ($Fs_{32.5}Wo_{6.2}$; FeO/MnO = 31); subcalcic augite ($Fs_{56.7}Wo_{30.9}$; FeO/MnO = 32) with ferroan pigeonite rims ($Fs_{53.1}Wo_{18.1}$; FeO/MnO = 29); olivine ($Fa_{81.4}$; FeO/MnO = 42). Oxygen isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{17}O$ 1.78, 1.84; $\delta^{18}O$ 3.81, 3.81; $\Delta^{17}O$ -0.228, -0.163 per mil.
Classification: Basaltic eucrite (anomalous). This specimen is unusual because of its diabasic texture and complexly-zoned pyroxenes.

Northwest Africa 7214 (NWA 7214)
Western Sahara
Found: 2006
Classification: Enstatite achondrite (Aubrite)
History: A 2200 g crusted stone was found in Western Sahara and purchased by A. Aaronson in 2010.
Physical characteristics: Desert ablation has mostly polished the fusion crust into a translucent veneer with very limited chemical weathering.
Petrography: Composed mostly of fine-to medium-grained (0.3 to 1.2 mm), euhedral to subhedral equilgranular enstatite together with interstitial metal, schreibersite, graphite, a silica phase present as round inclusions in FeS, daubreelite, FeS, brezinaite and oldhamite are typically found together in complex clusters. Plagioclase is present as small intercumulus lath-shaped grains. With the exception of the underside, the stone is very fresh (W0/1) with no oxidation of metal, shock level is low.
Geochemistry: Enstatite is essentially Fe-free ($En_{99.6}Fs_{0.1}Wo_{0.3}$). Kamacite contains 5.3 wt % Ni and is Si-enriched (Si = 4.0 to 5.8 wt %). FeS contains 2.3 - 3.6wt % Ti and 1.8 wt % Cr. The rare mineral brezinaite consists of S, 45.4 wt %; Cr, 46.3 - 52.1wt %; Fe, 9.1 to 3.0 wt % and 1.1 wt % Mn. Plagioclase is $An_{4.2.}$
Classification: Achondrite (aubrite).
Specimens: A total of 20.6 g is on deposit at *PSF*. *DPitt* holds the main mass of 2.2 kg.

Northwest Africa 7216 (NWA 7216)
(Northwest Africa)
Purchased: 2010
Classification: Ureilite
Petrography: The meteorite displays a cumulate texture of up to 1-mm-sized olivine, orthopyroxene, and pigeonite grains. Olivine shows characteristic reduced rims. Carbon is present as graphite.
Geochemistry: Reduced rims in olivine: $Fa_{3.8\text{-}8.5}$; opx: $Fs_{9.2}Wo_{4.9}$; pigeonite $Fs_{9.4}Wo_{8.7}$

Northwest Africa 7222 (NWA 7222)
(Northwest Africa)
Purchased: 2011
Classification: HED achondrite (Eucrite, polymict)
Petrography: The rock is partly covered with fusion crust and displays a dark greyish interior. It is composed of up to 2-mm-sized basaltic, melt and mineral clasts set into a fine-grained clastic matrix. Mineral clasts and dominant matrix minerals are calcic plagioclase and pyroxenes with very fine exsolution lamellae. Accessory phases include SiO_2, chromite, and troilite. Contains ~5% diogenitic material.
Geochemistry: Ca-poor pyroxene: $Fs_{31.9\text{-}60.7}Wo_{4.8\text{-}13.6}$, FeO/MnO=23-33; Ca-rich pyroxene: $Fs_{45.1\text{-}65.2}Wo_{20.2\text{-}37.9}$, FeO/MnO=27-49; calcic plagioclase: $An_{87.4}$ (range 82.3-91.4).

Northwest Africa 7223 (NWA 7223)

(Northwest Africa)
Purchased: 2011
Classification: HED achondrite (Eucrite, polymict)

Petrography: The meteorite is partly covered with black fusion crust and shows a light greyish interior, with abundant whitish plagioclase grains. It shows a typical basaltic texture with exsolved pyroxene and often lath-shaped plagioclase. Rarely lithic clasts of differently textured basaltic lithologies and dark melt clast are encountered. Minor phases include chromite, SiO_2, and FeNi metal. Contains ~3% diogenitic material.

Geochemistry: Ca-poor pyroxene: $Fs_{59.1\text{-}65.1}Wo_{1.5\text{-}9.7}$, FeO/MnO=30-34; Ca-rich pyroxene: $Fs_{27.7\text{-}33.9}Wo_{40.6\text{-}42.7}$, FeO/MnO=29-37; calcic plagioclase: An_{89} (range $An_{85.3\text{-}90}$).

Northwest Africa 7229 (NWA 7229)
(Northwest Africa)
Purchased: 2011
Classification: HED achondrite (Eucrite, polymict)

Petrography: The meteorite is almost completely covered by fusion crust and displays a fresh greyish interior. Different lithic clast are easily discernible and include basaltic lithologies with different grain sizes and dark melt clasts. Mineral fragments are calcic plagioclase and different pyroxenes, i.e. exsolved Ca-rich pyroxenes and often chemically zones Ca-poor pyroxenes. Minor phases are SiO_2, chromite, and pyrrhotite.

Geochemistry: opx: $Fs_{4\text{-}62.5}Wo_{0.8\text{-}5}$, FeO/MnO=27-36; cpx: $Fs_{17.7\text{-}33.2}Wo_{42.1\text{-}44.9}$, FeO/MnO=28-33; calcic plagioclase: An_{93} (range 89.1-94.8. Orthopyroxenes display compositional zoning with cores as low as $Fs_{4.}$

Northwest Africa 7230 (NWA 7230)
(Northwest Africa)
Purchased: 2011
Classification: HED achondrite (Diogenite)

Petrography: The small individual is partly covered with fusion crust and shows a light-gray interior. The meteorite displays a cumulate texture of dominantly large low Ca pyroxene crystals, less abundant calcic plagioclase, and rare Ca-rich pyroxene. Accessory minerals include chromite and troilite.

Geochemistry: low Ca pyroxene $Fs_{24.9\text{-}25.4}Wo_{1.8\text{-}5.5}$, FeO/MnO=29-32; Ca-rich pyroxene: $Fs_{13.8\text{-}14.7}Wo_{43.7\text{-}44.9.}$ FeO/MnO=22-27 ; plagioclase: $An_{86.5}$, range $An_{83.8\text{-}88.}$

Northwest Africa 7231 (NWA 7231)
(Northwest Africa)
Purchased: 2011
Classification: HED achondrite (Eucrite, polymict)

Petrography: The individuals are almost completely covered by a partly shiny black fusion crust; the interior appears dark-grayish with visible whitish plagioclase grains. It is composed of basaltic and melt clasts set into a clastic matrix of dominantly exsolved pyroxene and calcic plagioclase. Accessories include chromite, troilite, SiO_2, and rare FeNi metal.

Geochemistry: opx: $Fs_{19.8\text{-}63.9}Wo_{2.1\text{-}6.4}$, FeO/MnO=27-33; cpx: $Fs_{24.9\text{-}225.4}Wo_{42.9\text{-}43.8}$, FeO/MnO=30-31; calcic plagioclase: $An_{91.3}$ (range 76.7-94.7)

Northwest Africa 7234 (NWA 7234)
(Northwest Africa)
Purchased: 2011
Classification: HED achondrite (Eucrite, polymict)

Petrography: The single fragment is partly covered with fusion crust and displays a light-grayish interior. It is composed of mineral and lithic clasts including basaltic and melt lithologies. Mineral

fragments are large mostly exsolved pyroxenes and calcic plagioclase. Minor phases include chromite, trolite, and SiO_2 polymorphs. The meteorite is crosscut by several shock-melt veins.
Geochemistry: opx: $Fs_{60.5-64.1}Wo_{2-4.7}$, FeO/MnO=28-34; cpx: $Fs_{27.1-28.6}Wo_{42.9-44.6}$, FeO/MnO=30-36; calcic plagioclase: An_{89} (range 85.3-90).

Northwest Africa 7263 (NWA 7263)
(Northwest Africa)
Purchased: 2012 Mar
Classification: HED achondrite (Eucrite)
History: Purchased in Temara, Morocco by *Aaronson* in 2012 March.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively coarse grained plutonic assemblage of exsolved pigeonite, calcic plagioclase, silica polymorph, ilmenite and troilite.
Geochemistry: Exsolution lamellae of augite ($Fs_{21.7-23.8}Wo_{42.0-39.4}$, FeO/MnO = 30-32) within host orthopyroxene ($Fs_{49.3-51.1}Wo_{3.2-1.7}$, FeO/MnO = 25-31).
Classification: Eucrite (gabbroic).

Northwest Africa 7265 (NWA 7265)
(Northwest Africa)
Purchased: 2012 Mar
Classification: Carbonaceous chondrite (CR2)
History: Purchased by *Aaronson* in 2012 March in Temara, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, medium-sized (0.3 to 0.7 mm) complex chondrules (some with dust rims) and angular mineral grains in a dark matrix containing cronstedtite. Other minerals are olivine, orthopyroxene, subcalcic augite, troilite and minor kamacite. One small CAI containing pink spinel was found.
Geochemistry: Olivine ($Fa_{0.6-24.2}$), orthopyroxene ($Fs_{1.1-1.9}Wo_{1.2-0.8}$), subcalcic augite ($Fs_{1.1}Wo_{38.4}$).
Classification: Carbonaceous chondrite (CR2).

Northwest Africa 7266 (NWA 7266)
(Northwest Africa)
Purchased: 2012 Feb
Classification: HED achondrite (Eucrite)
History: Purchased by *GHup*é in 2012 February from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very fresh specimen composed of rounded clasts (up to 8 mm across) of ophitic-textured basaltic eucrite in a deep brown, fine grained matrix. Clasts consist of exsolved pigeonite, calcic plagioclase, silica polymorph, ilmenite and troilite. Both pyroxene and plagioclase exhibit undulose extinction, and The matrix consists of numerous tiny crystal fragments derived from eucrites (as well as rare grains of merrillite) within brown glass.
Geochemistry: Exsolution lamellae of augite ($Fs_{25.3-26.6}Wo_{43.8-43.3}$; FeO/MnO = 31-32) within host orthopyroxene ($Fs_{55.8-60.3}Wo_{5.6-2.4}$; FeO/MnO = 30-32).
Classification: Eucrite. This specimen represents a basaltic eucrite protolith that has undergone fragmentation and partial melting, presumably as a consequence of impact processes.

Northwest Africa 7270 (NWA 7270)
(Northwest Africa)
Purchased: 2012 Feb
Classification: HED achondrite (Eucrite)
History: Purchased by *GHup*é in 2012 February from a Moroccan dealer at the Tucson Gem and Mineral Show.

Petrography: (A. Irving and S. Kuehner, *UWS*) Complex fragmental breccia composed mainly of shocked gabbroic eucrite clasts and some dark, fine grained, quench-textured eucrite clasts in a sparse fragmental matrix. Gabbroic eucrite clasts consist predominantly of pyroxenes and calcic plagioclase (exhibiting spherulitic texture of lamellar birefringent subgrains). The specimen exhibits orange staining from terrestrial weathering of minor metal.
Geochemistry: Orthopyroxene ($Fs_{19.5}Wo_{1.3}$; $Fs_{36.3}Wo_{2.0}$; $Fs_{53.7}Wo_{5.7}$; FeO/MnO = 29-33), pigeonite ($Fs_{47.5}Wo_{19.1}$; $Fs_{52.9}Wo_{8.7}$; FeO/MnO = 31-32), augite ($Fs_{25.0}Wo_{40.9}$; FeO/MnO = 28).
Classification: Eucrite, polymict.

Northwest Africa 7287 (NWA 7287)
(Northwest Africa)
Found: 2011
Classification: Ordinary chondrite (LL3-6)
History: Discovered by local people in the Tindouf area in 2011, purchased in Agadir in 2012 Feb.
Physical characteristics: One brown stone of 2564 g mostly covered with black-brown crust; saw-cut shows chondrules and various clasts set in fine-grained brown matrix. Magnetic susceptibility log χ = 3.75.
Petrography: Microprobe examination of a thin section shows fractured fine clastic matrix with mineral fragments, common porphyritic chondrules of 0.5 mm, and clasts of various textures. Beside matrix, five distinct lithologies identified based on texture and mineral composition
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Matrix: Olivine $Fa_{0.5\text{-}4.3}$, mean $Fa_{29.5\pm5.9}$, n=18; pyroxene $Fs_{20.1\text{-}26.5}Wo_{0.5\text{-}4.3}$, mean $Fs_{23.9\pm2.1}Wo_{2.4\pm1.4}$, n=8. Clasts (all): Olivine $Fa_{24.1\text{-}34.0}$, mean $Fa_{30.0\pm1.6}$, n=89; pyroxene $Fs_{3.3\text{-}28.6}Wo_{0.3\text{-}4.3}$, mean $Fs_{22.4\pm6.6}$,$Wo_{2.2\pm0.1}$, n=29.
Classification: Ordinary Chondrite (LL3-6)
Specimens: 25.6 g on deposit at *Rio*, main mass *Bart*.

Northwest Africa 7288 (NWA 7288)
(Northwest Africa)
Found: 2011
Classification: Ordinary chondrite (LL6)
History: Discovered by local people in the Tindouf area in 2011, purchased in Agadir in 2012 Feb.
Physical characteristics: Light-brown 256.1 g stone, with small knobby metal protuberances, saw-cut shows poorly defined chondrules set in fine-grained matrix. Magnetic susceptibility log χ = 3.61.
Petrography: Microprobe examination of a thin section shows fine (mean 30 μm) matrix, bearing granophyric clasts (grain-size mean 0.2 mm) and pyroxene up to 2 mm, often with poikilitic olivine, and and rare poorly developed chondrules (~1.2 mm). Rare relict chondrules are present.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) host: Olivine: $Fa_{29.6\text{-}30.3}$, mean $Fa_{30.0\pm0.3}$, n=4; Ca-rich pyroxene $Fs_{11}En_{47}Wo_{42}$; kamacite Ni=4.1, Co=2.2; taenite Ni=29.7, Co=1.4. Clast: $Fa_{29.3\text{-}30.5}$, mean $Fa_{30.0\pm0.3}$, n=12; Ca-rich pyroxene $Fs_{10}En_{46}Wo_{44}$; kamacite Fe=6.6, Co=3.1; taenite Ni=43.2, Co=0.96 (all wt.%).
Classification: Ordinary Chondrite (LL6)
Specimens: 21.3 g on deposit at *Rio*, main mass *Bart*.

Northwest Africa 7289 (NWA 7289)
(Northwest Africa)
Found: 2011
Classification: Rumuruti chondrite (R4)
History: Discovered by local people in Erg Chech in 2011, purchased in Agadir in 2012 Feb.
Physical characteristics: Two black stones of 25.2 and 15.6 g, both fusion crusted, the bigger one with primary and secondary crust. Saw-cut shows light-gray chondrules set in fine-grained, darker gray matrix together with paler clasts. Magnetic susceptibility log χ =3.59.

Petrography: Thin section shows numerous dominantly porphyritic, but also barred chondrules up to 1 mm (mean 0.6 mm), various mineral fragments and clasts set in fine-grained matrix.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Olivine: $Fa_{35.7-40.3}$, mean 39.6, σ=0.90 (n=22); low-Ca pyroxene $Fs_{31.5}Wo_{1.8}$ (n=1), ; Ca-rich pyroxene $Fs_{12}En_{43}Wo_{46}$ (n=2); feldspar $An_{7-9}Or_{4-5}$ (n=3); chromite: Cr/(Cr+Al) = 84, Fe/(Fe+Mg) = 98 (n=3).
Classification: Rumuruti chondrite (R4)
Specimens: 8.3 g on deposit at *Kiel*, main mass *Bart*.

Northwest Africa 7290 (NWA 7290)
(Northwest Africa)
Found: 2011
Classification: Ureilite
History: Discovered by local people inthe Erg Chech area in 2011, purchased in Agadir in 2012 Feb.
Physical characteristics: Two black to brown fragments with oriented fusion crust and a further 16 small fragments, totalling 52.3 g. Saw-cut surface shows brown patches in dark matrix. Magnetic susceptibility log $\chi = 4.35$.
Petrography: Thin section displays olivine and pyroxene crystallites with triple junctions, grain size 0.5-5 mm. Grain boundaries occupied with graphite and metal.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Olivine: $Fa_{21.2-22.8}$; mean 22.2; σ=0.48; Cr_2O_3=0.7-0.8 wt.%; Fe/Mn=45, σ=6.3 (n=16). Ca-pyroxene: $Fs_{18.6}En_{73.6}Wo_{7.8}$ (n=3). Kamacite: Ni=3.3, Co=0.45, Si=0-6.2 wt.% (n=3).
Classification: Ureilite
Specimens: 10.5 g on deposit at *Kiel*, main mass *Bart*.

Northwest Africa 7291 (NWA 7291)
Mauritania
Found: 2011
Classification: Rumuruti chondrite (R3-5)
History: Discovered by local people in Mauritania in 2011, purchased in Nouadhibou in 2012 May.
Physical characteristics: Nine stones totaling 681 g, partly covered with fusion crust, saw-cut surface shows chondrules set in fine-grained, brown matrix and various lighter and darker clasts. Magnetic susceptibility log χ =3.08-3.20.
Petrography: Thin section shows numerous dominantly porphyritic, but also barred chondrules up to 1 mm (mean 0.3 mm), and various clasts set in fine-grained recrystallized matrix. The darker clasts show very fine matrix.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Olivine: $Fa_{39.3-42.1}$, mean $Fa_{39.9\pm0.7}$, n=15; Ca-low pyroxene: $Fs_{19.8}Wo_{1.1}$ ($Fs_{11.3-32.8}Wo_{0.4-1.8}$, n=2); Ca-pyroxene: $Fs_{10-16}En_{42-50}Wo_{34-46}$; dark type 3 clast: $Fa_{35.8-48.6}$, mean $Fa_{40.7\pm6.1}$, n=20. Accessory chromite, pentlandite, troilite, apatite.
Classification: Rumuruti chondrite (R3-5)
Specimens: 15.8 g on deposit at *Rio* plus 4.3 g at *Kiel*, main mass *SBuhl* (102 g incl. a 72 g specimen) and 112 g with *Bart*.

Northwest Africa 7292 (NWA 7292)
Mauritania
Found: 2011
Classification: HED achondrite (Eucrite)
History: Discovered by local people in Mauritania in 2011, purchased in Nouadhibou in 2012 March.
Physical characteristics: One 9.9 g stone, largely covered with black glossy fusion crust, saw-cut surface shows breccia of minor fine-grained gray groundmass with subophitic clasts. Magnetic susceptibility log χ =2.86.

Petrography: Microprobe examination of a thin section shows clasts of subophitic texture separated by fine-grained veins, many pyroxenes with exsolution lamellae. Monomict breccia based on similar pyroxene compositional range in host and clasts.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Ca-poor pyroxene: $Fs_{61-63}En_{34-37}$ (n=3); Ca-pyroxene: $Fs_{34-61}En_{30-36}Wo_{5-36}$ (N=9); feldspar: $An_{79-92}Or<1.5$ (n=17); ilmenite and SiO_2.
Classification: Achondrite (Eucrite, monomict)
Specimens: 2.0 g on deposit at *Kiel*, main mass *Bart*.

Northwest Africa 7294 (NWA 7294)
Mauritania
Found: 2011
Classification: Ureilite
History: Discovered by local people in Mauritania in 2011, purchased in Nouadhibou in 2012 May.
Physical characteristics: Single 209 g stone, irregular, dark exterior with remnant patches of fusion crust. Sawn surface shows brown clasts in nearly black groundmass, with scattered, small worm-like metal inclusions. Magnetic susceptibility log $\chi = 4.71$.
Petrography: Microprobe examination of a thin section shows olivine, ortho- and clinopyroxene crystallites with triple junctions, mean grain size 1 mm. Large (~4 mm) pigeonite poikilitically enclose olivine crystals. Olivine shows irregular and parallel fractures. Graphite and metal form intergranular patches and grain boundaries.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Olivine: $Fa_{15.2-20.5}$, mean 19.4, σ = 1.29; Cr_2O_3=0.5-1.0 wt.%; Fe/Mn=43, σ=6.6 (n=21). Low-Ca pyroxene: $Fs_{16.9-17.4}$, mean 17.5, σ = 0.19; $Wo_{3.7-3.9}$, mean 1,3, σ = 0.09 (n=5). Kamacite: Ni=0.2-5.5, Co=0.2-0.6, Si=0-7.8 wt.%.
Classification: Ureilite (bimodal)
Specimens: 14.7 g on deposit at *Rio* plus 5.5 g at *Kiel*, main mass *Bart* (88 g) and 82 g with *SBuhl*.

Northwest Africa 7297 (NWA 7297)
(Northwest Africa)
Purchased: 2010
Classification: Primitive achondrite (Brachinite)
History: Purchased in Morocco in 2010.
Physical characteristics: Several stones totaling 78.8 g, rough, rusty exterior. Broken surface shows mosaic of lustrous brown fine-grained crystals. Sawn surface displays dark brown, partly gray crystalline matrix with rusty inclusions and fractures. Magnetic susceptibility log χ =4.07.
Petrography: Microprobe examination of a thin section shows olivine ~70%, Ca-pyroxene ~25%, opaques ~5%. Polygonal texture of silicate grain size up to 1 mm with triple junctions; intergranular chromite up to 0.5 mm.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Olivine $Fa_{29.7-31.3}$, mean 30.55, σ = 0.39, Fe/Mn=59±8 (n=20); augite: $Fs_{9.5-10.3}En_{45.3-46.2}Wo_{43.9-45.1}$, TiO_2=0.2, Al_2O_3=0.8, Cr_2O_3=0.8, Na_2O=0.5 wt.% (n=12). chromite: Cr/(Cr+Al) = 82, Fe/(Fe+Mg) = 77-78.
Classification: Primitive achondrite (Brachinite)
Specimens: 8.3 g on deposit at *Kiel* plus 7.7 g at *Rio*, main mass M. Bilet (As, Norway) and 7.7 g with *Bart*.

Northwest Africa 7306 (NWA 7306)
(Northwest Africa)
Purchased: 2011 Mar
Classification: Carbonaceous chondrite (CM, anomalous)
History: Purchased by Gary Fujihara in March 2011 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Tiny (typically <0.2 mm) chondrules (some with dust rims) and sparse mineral fragments (olivine, orthopyroxene) are set in an abundant, black, very fine

grained matrix composed of unresolvable mafic silicates, abundant troilite (some in polycrystalline clusters) and taenite.
Geochemistry: Olivine (in chondrules $Fa_{3.4-4.3}$; angular grain $Fa_{32.1}$), orthopyroxene (in chondrules $Fs_{1.8-3.0}Wo_{1.4-0.9}$; angular grain $Fs_{7.7}Wo_{3.7}$). Oxygen isotopes (K. Ziegler, *UNM*): analyses of acid-washed subsamples by laser fluorination gave, respectively $\delta^{17}O = 3.073, 2.295$; $\delta^{18}O = 8.232, 7.052$; $\Delta^{17}O = -1.273, -1.428$ per mil (for a TFL slope of 0.528). These values do not plot on any established trends and lie above the trend for CM chondrites.
Classification: Carbonaceous chondrite, CM, anomalous based on the elevated $\Delta^{17}O$ relative to the main CM2 field.

Northwest Africa 7307 (NWA 7307)
(Northwest Africa)
Purchased: 2012 Feb
Classification: Carbonaceous chondrite (CK4)
History: Purchased by Gary Fujihara in February 2012 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Composed of abundant, well-formed, separated chondrules in a recrystallized matrix containing stained chromian magnetite.
Geochemistry: Olivine ($Fa_{29.3\pm0.0}$), orthopyroxene ($Fs_{24.8-25.0}Wo_{0.6}$). Three separate olivines analyzed by EMPA have identical compositions within error.
Classification: Carbonaceous chondrite (CK4).

Northwest Africa 7309 (NWA 7309)
(Northwest Africa)
Purchased: 2012 Mar
Classification: Carbonaceous chondrite (CM2)
History: Purchased by Gary Fujihara in March 2012 from a dealer in Agadir, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Small chondrules, some mineral fragments and sparse, fine grained CAI in a very dark, slightly stained matrix containing cronstedtite-tochilinite and minor pentlandite.
Geochemistry: Olivine ($Fa_{0.5-43.9}$), orthopyroxene ($Fs_{1.2-1.3}Wo_{2.6-0.9}$), clinopyroxene ($Fs_{4.1}Wo_{39.6}$).
Classification: Carbonaceous chondrite (CM2).

Northwest Africa 7310 (NWA 7310)
(Northwest Africa)
Purchased: 2012 Feb
Classification: Carbonaceous chondrite (CK4)
History: Purchased by Gary Fujihara in February 2012 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh specimen composed of well-formed, separated chondrules in a recrystallized matrix containing fairly abundant intermediate plagioclase, chromian magnetite and pentlandite.
Geochemistry: Olivine ($Fa_{27.6-27.9}$), orthopyroxene ($Fs_{25.3}Wo_{0.5}$), pigeonite ($Fs_{22.6}Wo_{6.9}$), augite ($Fs_{12.1}Wo_{37.1}$).
Classification: Carbonaceous chondrite (CK4).

Northwest Africa 7311 (NWA 7311)
(Northwest Africa)
Purchased: 2012 Apr
Classification: Carbonaceous chondrite (CO3)
History: Purchased in Temara, Morocco by *Aaronson* in April 2012. Whole stone.

Petrography: (A. Irving and S. Kuehner, *UWS*) Unequilibrated specimen consisting of small (typically <0.3 mm) chondrules, mineral fragments and rare CAI in a matrix composed mainly of ferroan olivine, iron sulfide and minor altered kamacite.
Geochemistry: Olivine ($Fa_{0.2-48.3}$; Cr_2O_3 in ferroan olivines = 0.06-0.09 wt.%, mean 0.07 wt.%, s.d. 0.02 wt.%, N =7), orthopyroxene ($Fs_{2.4-6.2}Wo_{3.0-0.6}$), pigeonite ($Fs_{1.2}Wo_{19.3}$), clinopyroxene in CAI ($Fs_{0.8}Wo_{50.1}$).
Classification: Carbonaceous chondrite (CO3).

Northwest Africa 7316 (NWA 7316)
(Northwest Africa)
Purchased: 2012 Apr
Classification: Ordinary chondrite (H5)
History: Purchased by *Kuntz* in April 2012 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Largely recrystallized, but with sparse, medium-sized (to 0.7 mm) chondrules and partial chondrules. There is a moderate content of fairly fresh metal grains, but also some thin cross-cutting, orange iron hydroxide veinlets.
Geochemistry: Olivine ($Fa_{21.5-21.8}$) with FeO/MnO=43, orthopyroxene ($Fs_{17.8-18.8}Wo_{0.4-1.3}$) with FeO/MnO=23-27, clinopyroxene ($Fs_{15.6}Wo_{13.2}$).
Classification: Ordinary chondrite (H5). May be transitional H/L5 based on the olivine and pyroxene compositions, including their FeO/MnO ratios, being intermediate between those established for equilibrated H and L chondrites.

Northwest Africa 7317 (NWA 7317)
Northwest Africa
Purchased: 2012
Classification: CR6
History: Purchased by Marcin Cimala and Tomek Jakubowski from two separate dealers in Erfoud and Zagora in 2012 April and June.
Physical characteristics: Four fresh, pale greenish stones (122 g, 151 g, 187 g, 636 g), all partially coated with black fusion crust.
Petrography: (A. Irving and S. Kuehner, *UWS*) Overall poikiloblastic texture, but there are rare BO chondrules with annular olivine rims. Minerals present include olivine (some as larger grains), orthopyroxene, minor clinopyroxene, intermediate plagioclase, fresh kamacite, chromite, troilite, and merrillite.
Geochemistry: Olivine ($Fa_{38.0-38.2}$, FeO/MnO = 72-79), orthopyroxene ($Fs_{29.3-29.4}Wo_{3.3-3.0}$, FeO/MnO = 53-61), clinopyroxene ($Fs_{12.8-14.2}Wo_{42.7-40.5}$, FeO/MnO = 40-41). Oxygen isotopes (R. Tanaka, *OkaU*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{17}O$ = 0.057, 0.064; $\delta^{18}O$ = 3.507, 3.594; $\Delta^{17}O$ = -1.788, -1.827 per mil.
Classification: Carbonaceous chondrite (CR6). This specimen is a highly equilibrated CR chondrite paired with NWA 2994, NWA 3250, NWA 6901 and NWA 6921.
Specimens: A total of 22 g of sample and one polished thin section are on deposit at *UWB*. Mr. M. Cimala and Mr. T. Jakubowski jointly hold the main masses.

Northwest Africa 7321 (NWA 7321)
(Northwest Africa)
Purchased: 2012 Apr
Classification: Primitive achondrite (Acapulcoite)
History: Purchased by Stefan Ralew in April 2012 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively fine grained and equigranular with abundant triple-grain junctions between silicate minerals. Minerals are orthopyroxene, olivine, clinopyroxene, sodic plagioclase, altered kamacite and troilite. Chromite appears to be absent.

Geochemistry: Orthopyroxene ($Fs_{11.5\text{-}11.6}Wo_{2.0\text{-}1.4}$, FeO/MnO = 12-14), olivine ($Fa_{12.3\text{-}13.1}$, FeO/MnO = 19-20), clinopyroxene ($Fs_{4.3\text{-}5.2}Wo_{45.3\text{-}43.8}$, FeO/MnO = 9).
Classification: Acapulcoite
Specimens: 20.85 g of sample and one polished thin section are on deposit at *UWB*. S. *Ralew* holds the main mass.

Northwest Africa 7322 (NWA 7322)
(Northwest Africa)
Purchased: 2012 Apr
Classification: Ordinary chondrite (H4)
History: Purchased by Stefan Ralew in April 2012 from a dealer in Erfoud, Morocco.
Petrography: Well-formed, small chondrules and abundant altered metal in the matrix. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{18.9\text{-}19.2}$), orthopyroxene ($Fs_{16.7\text{-}17.3}Wo_{1.5\text{-}1.2}$), clinopyroxene ($Fs_{6.3\text{-}6.5}Wo_{44.8\text{-}44.2}$)
Classification: Ordinary chondrite (H4).

Northwest Africa 7323 (NWA 7323)
(Northwest Africa)
Purchased: 2012 Apr
Classification: Ordinary chondrite (LL3)
History: Purchased by Stefan Ralew in April 2012 from a dealer in Erfoud, Morocco.
Petrography: Fairly large, well-formed chondrules and relatively low content of altered metal. Olivine, orthopyroxene, pigeonite, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{2.3\text{-}48.4}$), Cr_2O_3 in ferroan olivine = 0.06-0.25 wt.%, mean 0.13 wt.%, s.d. 0.07 wt.%, N = 7), orthopyroxene ($Fs_{2.3\text{-}6.7}Wo_{0.4\text{-}0.3}$), pigeonite ($Fs_{12.1}Wo_{6.7}$).
Classification: Ordinary chondrite (LL3).

Northwest Africa 7387 (NWA 7387)
(Northwest Africa)
Purchased: 2012
Classification: Martian meteorite (Shergottite)
History: Purchased by Giorgio Tomelleri in Erfoud, Morocco.
Physical characteristics: The sample is covered with a black fusion crust.
Petrography: (V. Moggi Cecchi, G. Pratesi, S. Caporali, *MSP*): Cumulate, fine-grained, porphyritic texture consisting of a few large rounded and zoned phenocrysts of brown olivine up to 1200 μm, set in a fine-grained basaltic groundmass of twinned, tabular pyroxene crystals 90 to 2100 μm wide and 120 to 780 μm long. These crystals are surrounded by interstitial glassy matrix, dominated by maskelynite. Pyroxene is primarily pigeonite with subordinate enstatite. Other minerals are chromite, titanian chromite and ilmenite, up to 110 μm, merrillite, and rare pyrrhotite grains up to 40 μm in size. Shock features include strong mosaicism and planar deformation in olivine, undulose extinction and twinning in pyroxene.
Geochemistry: Olivine $Fa_{40.45}$ (mean of 26 analyses; FeO/MnO = 50.3); orthopyroxene ($Fs_{29.46}En_{60.87}Wo_{9.87}$; FeO/MnO = 30.9); pigeonite ($Fs_{18.79}En_{48.09}Wo_{33.13}$; FeO/MnO = 32.5-46.5). Maskelynite glass ($An_{46.34.15}Or_{2.96}$). Oxygen isotopes: (I.Franchi, R.Greenwood, *OU*) $\delta^{17}O = 2.68$, $\delta^{18}O = 4.54$, and $\Delta^{17}O = 0.322$ all per mil.
Classification: Martian (Shergottite)
Specimens: 20.13 g plus one polished thin section and a block are on deposit at *MSP* (MSP 5203). Tomelleri holds the main mass.

Northwest Africa 7388 (NWA 7388)
Northwest Africa

Purchased: 2007
Classification: Primitive achondrite (Brachinite)

History: Purchased by Philip Mani from Greg Hupé, who bought the stone from a Moroccan dealer in 2007.

Physical characteristics: Very dark, rounded stone with partial black fusion crust. The interior is black and composed of interlocking grains.

Petrography: (A. irving and S. Kuehner, *UWS*) Protogranular aggregate of olivine with less augite and accessory V-Ti-bearing chromite. Olivine contains rare inclusions of Ni-poor taenite, and chromite contains sparse inclusions of chlorapatite, merrillite and magnetite. Intergrowths of pure iron metal + orthopyroxene are present along olivine grain boundaries.

Geochemistry: Olivine ($Fa_{29.8}$, FeO/MnO = 56; rim $Fa_{27.9}$), augite ($Fs_{9.0\text{-}9.1}Wo_{47.4\text{-}47.3}$; FeO/MnO = 58-60; Al_2O_3 = 1.2 wt.%; Cr_2O_3 = 0.8 wt.%). Oxygen isotopes (K. Ziegler, *UNM*): analyses of acid-washed subsamples by laser fluorination gave $\delta^{17}O$ = 2.862, 2.705; $\delta^{18}O$ = 5.635, 5.413; $\Delta^{17}O$ = -0.113, -0.153 per mil.

Classification: Brachinite. This specimen differs from other brachinites in having distinctive reaction assemblages along grain boundaries.

Specimens: A total of 10.4 g of material and one polished thin section are on deposit at *UWB*. The main mass is held by Mr. P. Mani.

Northwest Africa 7396 (NWA 7396)
(Northwest Africa)
Purchased: 2012 Jun
Classification: Carbonaceous chondrite (CO3)

History: Purchased by *GHupé* in June 2012 from a Moroccan dealer at the St. Marie aux Mines Show.

Petrography: (A. Irving and S. Kuehner, *UWS*) Composed of very small (typically <0.3 mm), well-formed chondrules and sparse, fine-grained CAI in a deep brown, fine-grained matrix.

Geochemistry: Olivine ($Fa_{0.3\text{-}66.6}$; Cr_2O_3 in ferroan olivine = 0.09-0.13 wt.%, mean 0.11 wt.%, s.d. 0.02, N = 7), orthopyroxene ($Fs_{1.1\text{-}16.5}Wo_{0.9\text{-}4.6}$), clinopyroxene ($Fs_{1.3\text{-}2.7}Wo_{47.7\text{-}51.3}$).

Classification: Carbonaceous chondrite (CO3).

Northwest Africa 7397 (NWA 7397)
Northwest Africa
Purchased: 2012 Jun
Classification: Martian meteorite (Shergottite)

History: Found near Smara, Morocco and purchased by Darryl Pitt and David Gheesling from a dealer in Zagora, Morocco in 2012 June.

Physical characteristics: A 2130 g, partially covered in fusion crust. Interior larger ovoid crystals in a finer grained matrix.

Petrography: (A. Irving and S. Kuehner, *UWS*) Large oikocrysts (up to 1.5 cm across) of low-Ca pyroxene enclose multiple chadacrysts of olivine and Cr-rich chromite. Relatively equigranular domains between oikocrysts are composed of low-Ca and high-Ca pyroxene (showing very limited compositional zoning), maskleynite and olivine with accessory merrillite, Ti-chromite, pyrrhotite and ilmenite (with associated grains of baddeleyite up to 10 μm across). Olivine contains sparse melt inclusions composed of K-Na-Al-Si-rich glass surrounded by characteristic post-shock radial expansion microfractures.

Geochemistry: Olivine ($Fa_{38.9\text{-}40.7}$; FeO/MnO = 47-54), orthopyroxene ($Fs_{30.3}Wo_{3.3}$; FeO/MnO = 36), pigeonite ($Fs_{25.1\text{-}27.6}Wo_{6.6\text{-}10.0}$; FeO/MnO = 28-33), subcalcic augite ($Fs_{17.0\text{-}19.0}Wo_{35.1\text{-}35.4}$; FeO/MnO = 22-25). Bulk trace element composition (G. Chen, *UAb*): analysis by ICP-MS of clean wire-saw cutting dust gave (in ppm) La 1.66, Ce 4.48, Nd 2.93, Sm 1.13, Eu 0.3, Gd 1.59, Dy 1.95, Yb 1.02, Lu 0.14, Hf 1.66, Th 1.15, Rb 2.89, Sr 33.6.

Classification: Martian (shergottite, poikilitic).

Specimens: A total of 20 g of type material and one large polished thin section are on deposit at *UWB*. The main mass is held jointly by *DPitt* and D. Gheesling.

Northwest Africa 7399 (NWA 7399)
(Northwest Africa)
Purchased: 2012 Apr
Classification: Ureilite
History: Purchased by Beat Booz in April 2012 from a dealer in Marrakech, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Protogranular assemblage of olivine and grayish pigeonite, both of which have been recrystallized into myriad, very fine grained, polycrystalline aggregates. Grains of both olivine and pyroxene exhibit dark, more magnesian rims containing abundant blebs of iron metal.
Geochemistry: Olivine (cores $Fa_{24.8\text{-}24.9}$; rim $Fa_{12.0}$), pigeonite (core $Fs_{15.7}Wo_{8.7}$, rim $Fs_{10.2}Wo_{7.7}$).
Classification: Ureilite
Specimens: A total of 21.8 g of sample and one polished thin section are on deposit at *UWB*. Mr. B. Booz holds the main mass.

Northwest Africa 7400 (NWA 7400)
(Northwest Africa)
Purchased: 2012 May
Classification: HED achondrite (Eucrite, monomict)
History: Purchased by *JAaronson* in May 2012 from a delaer in Erfoud, Morocco.
Physical characteristics: Gray 138 g stone with stained metal.
Petrography: (A. Irving and S. Kuehner, *UWS*) Breccia consisting of relatively small clasts of ophitic-textured basaltic eucrite (with variable grain size) in a fairly abundant matrix composed of mostly fine grained, related crystal debris plus larger grains of heavily oxidized metal (which also occur in some lithic clasts). Minerals are exsolved pigeonite, anorthitic plagioclase, silica polymorph, altered Ni-free metal, ilmenite, rare altered troilite and very rare zircon (as inclusion in ilmenite).
Geochemistry: Orthopyroxene ($Fs_{66.9\text{-}67.3}Wo_{1.5\text{-}1.4}$, FeO/MnO = 30-31), clinopyroxene exsolution lamellae ($Fs_{39.3\text{-}44.6}Wo_{32.8\text{-}26.3}$, FeO/MnO = 31-32).
Classification: Eucrite (monomict breccia)
Specimens: 20 g of sample and two polished thin sections are on deposit at *UWB*. *JAaronson* holds the main mass.

Northwest Africa 7415 (NWA 7415)
Mauritania
Found: 2011
Classification: HED achondrite (Eucrite)
History: Discovered by local people in Mauritania in 2011, purchased in Nouadhibou in 2012 March.
Physical characteristics: Three dark gray stones of 36.2, 2.3, and 2.0 g. The biggest one is partly covered by black fusion crust. Saw-cut shows breccia of fine-grained gray groundmass with darker clasts and small white mineral inclusions. Magnetic susceptibility log χ =2.70-3.40.
Petrography: (R. Bartoschewitz, *Bart*) Microprobe examination of a thin section shows fine-grained (0.1 mm) cataclastic groundmass with fractured fragments of pyroxene and plagioclase up to 1 mm. Most pyroxenes show exsolution lamellae.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Ca-poor pyroxene: $Fs_{51.4\text{-}53.2}Wo_{2.2\text{-}4.4}$, mean $Fs_{52.5\pm0.94}Wo_{3.3\pm3.3}$ (n=3). Ca-pyroxene: $Fs_{45.0\text{-}55.1}En_{48.8\text{-}34.1}Wo_{5.3\text{-}20.5}$, mean $Fs_{49.7\pm2.4}En_{37.1\pm2.7}Wo_{13.2\pm3.6}$ (n=44). Feldspar: $An_{73\text{-}95}Or_{<3}$ (n=64). Accessory chromite: Cr/(Cr+Al) = 68, Fe/(Fe+Mg) = 94 (n=2) and ilmenite.
Classification: Achondrite (Eucrite-monomict).
Specimens: 6.5 g on deposit at *Kiel* plus 2.4 g at *Rio*, main mass *SBuhl* (20 g) and 10 g with *Bart*.

Northwest Africa 7416 (NWA 7416)
Mauritania
Found: 2011
Classification: HED achondrite (Howardite)
History: Discovered by local people in Mauritania in 2011, purchased in Nouadhibou in 2012 March.
Physical characteristics: Single 19.1 g stone nearly completely covered by black fusion crust, saw-cut surface shows breccia of fine-grained gray groundmass with pale clasts up to 6 mm and mineral fragments. Magnetic susceptibility log χ =3.32.
Petrography: Microprobe examination of a thin section shows fine-grained (0.1 mm) cataclastic groundmass with fractured fragments of pyroxene and plagioclase up to 1mm. Most pyroxenes show exsolution lamellae.
Geochemistry: Eucrite component: Ca-poor pyroxene $Fs_{36.4\text{-}63.8}Wo_{1.4\text{-}4.3}$, mean $Fs_{68.9\pm9.0}Wo_{2.5\pm0.8}$, n=14; pigeonite $Fs_{42\text{-}48}En_{51\text{-}34}Wo_{7\text{-}19}$ (n=2); augite $Fs_{26\text{-}39}En_{29\text{-}31}Wo_{44\text{-}30}$ (n=3); feldspar $An_{83\text{-}96}Or_{<1}$ (n=25); chromite Cr/(Cr+Al) = 78, Fe/(Fe+Mg) = 92, ilmenite. Diogenite component (~15%): Ca-poor pyroxene: $Fs_{22.2\text{-}29.6}Wo_{1.7\text{-}2.5}$, mean $Fs_{26.1\pm2.9}Wo_{2.5\pm0.6}$, n=7.
Classification: Achondrite (howardite), mixture of diogenite and eucrite lithologies.
Specimens: 4.0 g on deposit at *Kiel*, main mass *Bart*.

Northwest Africa 7418 (NWA 7418)
Mauritania
Found: 2011
Classification: Ordinary chondrite (LL6, melt breccia)
History: Discovered by local people in Mauritania in 2011, purchased in Nouadhibou in 2012 July.
Physical characteristics: Three light-brown stones, partly covered by fusion crust, 215.7 g in total. Saw-cut surface shows breccia of fine-grained light brown matrix with darker angular clasts. Broken face shows waxy lustre. Magnetic susceptibility log χ = 3.09.
Petrography: Microprobe examination of a thin section shows fine (mean, 40 μm) granophyric matrix of olivine, pyroxene and feldspar, bearing dominantly pyroxene (<0.8 mm), often with poikilitic olivine and feldspar, globular metal and troilite, and olivine (<0.3 mm). Rare relict chondrules are present.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Olivine: $Fa_{31.6\text{-}35.7}$, mean $Fa_{32.4\pm1.0}$ (n=16), Fe/Mn=61±6 (n=14) and Fe/Mn=82±2 (n=2); low Ca pyroxene: $Fs_{25.9\text{-}26.7}Wo_{2.6\text{-}3.8}$, mean $Fs_{26.2\pm0.3}Wo_{3.3\pm0.5}$ (n=6); Ca-rich pyroxene: $Fs_{11.2\text{-}13.9}En_{46\text{-}47}Wo_{39\text{-}42}$; feldspar: $An_{11\text{-}14}Or_{4\text{-}6}$; chromite: Cr/(Cr+Al) = 87, Fe/(Fe+Mg) = 88-91.
Classification: Ordinary chondrite (LL6-melt breccia) with anomalous characteristics. Strong recrystallized texture of moderately equilibrated olivine composition, dominantly with LL-chondritic Fe/Mn, plus some grains above the LL ratio.
Specimens: 20 g on deposit at *Kiel*, main mass *Gren* (100 g), 72 g with *Bart*, and 18 g with *SBuhl*.

Northwest Africa 7420 (NWA 7420)
(Northwest Africa)
Purchased: 2012 Feb
Classification: Carbonaceous chondrite (CK5)
History: Purchased in Agadir in Feb. 2012
Physical characteristics: Single stone, fusion crust partly covered by caliche, sawn face shows some chondrules and black inclusions set in a dark gray matrix.
Petrography: Microprobe examination of a thin section shows primarily fine-grained texture with olivine, pyroxene, magnetite, iron oxidation from weathering, and a few poorly developed chondrules up to 1 mm.

Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Olivine: $Fa_{29.6\text{-}30.4}$, mean $Fa_{30.0\pm0.3}$; Fe/Mn=110±26 (n=17); Ca-rich pyroxene: $Fs_{1.4\text{-}9.3}En_{0\text{-}42}Wo_{48\text{-}99}$ (n=8); magnetite: Cr_2O_3=3-4; Al_2O_3=0.3-3.7 wt.% (n=10).
Classification: Carbonaceous chondrite (CK5)
Specimens: 20.6 g on deposit at *Kiel*, main mass A. Koppelt (München) and 9 g with *Bart*.

Northwest Africa 7441 (NWA 7441)
(Northwest Africa)
Purchased: 2004
Classification: Ordinary chondrite (LL3.4)
Physical characteristics: Black fusion crust is mostly weathered away but is well preserved on one of the faces.
Petrography: (K. Guo, *ROM*): Chondrules are clearly defined on the cut surface, including a few white-colored chondrules >5 mm. One large 16 mm porphyritic chondrule with a white rim was present. The chondrules have an average diameter of 0.77±0.48 mm (N=50) and make up 75% of the thin section. Zoning of olivine is common. Troilite and silicate inclusions are common in metals. Matrix light-brown to black. Glass in the matrix appears ruby in both plain and crossed polarized light. In cathodoluminescnece (CL), the matrix is almost all nonluminescent with a few scattered areas emitting red CL. Chondrule mesostasis is non-luminescent (30%), emits dull red-blue (10%) or bright blue (60%) CL. Red CL in chondrule olivine is present but constitutes less than 10% of the areas. Olivine primarily shows sharp extinction. About 50% of the sulfides are replaced by iron oxides.
Geochemistry: Olivine $Fa_{20.2\pm11.1}$ (N=17), low-Ca pyroxene Fs11.5±6.2 $Fs_{11.5}En_{87}Wo_2$ (N=28), and high-Ca pyroxene $Fs_{20.6\pm20.0}En_{62}Wo_{17}$ (N=2); PMD FeO olivine=45.6 and PMD FeO low-Ca pyroxene=46.6; σ-Cr_2O_3=0.11 wt%, mean Cr_2O_3=0.06 wt%.
Classification: Ordinary chondrite LL3.4, S1, W2
Specimens: A total of 340.18 g is on deposit at *ROM*.

Northwest Africa 7442 (NWA 7442)
Northwest Africa
Purchased: 2004
Classification: Ordinary chondrite (H4)
Physical characteristics: The samples are generally rusty looking. Most of the fusion crust has been weathered away, but approximately 20% of fusion crust, appearing dark brown, remains and scatters around the surface with thickness less than 1 mm.
Petrography: (K. Guo, *ROM*): Chondrules and chondrule fragments make up 80% of the thin section. Metals and sulfides make up about 10% of the thin section. Troilite and silicate inclusions in metals are common. Matrix is fairly fine grained. Glass appearing bright red in transmitted light is present both in the matrix and shock veins. Shock veins are pervasive. The majority of olivine show undulose extinction. Approximately 50% of metal and sulfides are oxidized.
Geochemistry: Olivine $Fa_{18.8\pm3.9}$ (N=22), PMD FeO olivine= 12.3; two olivine points deviate from others by about 10 wt% in Fo content. If excluded. $Fa_{17.7\pm1.5}$ (N=20), PMD FeO olivine= 3.8; low-Ca pyroxene $Fs_{17.0\pm1.6}$, $Fs_{17}En_{81}Wo_1$ (N=35), high-Ca pyroxene Fs=13.4±11.3, $Fs_{13}En_{56}Wo_{31}$(N=4).
Classification: Ordinary chondrite H4; W2; S3.
Specimens: Specimen: A total of 295.48 g is on deposit at *ROM*

Northwest Africa 7443 (NWA 7443)
(Northwest Africa)
Purchased: 2004
Classification: Ordinary chondrite (LL4)
Physical characteristics: Remnant fusion crust. Brown meteorite with a few surface depressions resulting from eroded chondrules. Chondrules up to 5 mm in diameter are visible on the exterior.

Petrography: (K. Guo, *ROM*): Chondrules (up to 2 mm) make up 70-80% of the thin section. Chondrule types include 40% porphyritic olivine, 40% porphyritic pyroxene. 3-5% barred olivine, 3-5% radial pyroxene and 3-5% granular. The majority of olivine grains exhibit sharp extinction. Metal and sulfides (60 to 70% oxidized) are 10-15% in volume.
Geochemistry: Olivine $Fa_{27.6\pm0.5}$ (N=16), low-Ca pyroxene $Fs_{18.9\pm4.9}En_{89}Wo_2$ (N=25), and high-Ca pyroxene $Fs_{15.7\pm12.3}En_{40}Wo_{44}$ (N=5); PMD FeO olivine=0.95 and PMD FeO low-Ca pyroxene=22; σ-Cr_2O_3=0.27, mean Cr_2O_3=0.24.
Classification: Ordinary chondrite L4, S1, W3.
Specimens: A total of 144.56 g is on deposit at *ROM.*

Northwest Africa 7444 (NWA 7444)
(Northwest Africa)
Purchased: 2004
Classification: Ordinary chondrite (H5)
Physical characteristics: Brownish-black fusion crust is well preserved. The cut surface is metallic looking with a few mm-wide shock veins. A well-defined white-colored chondrule 4 mm in diameter stands out on the cut surface of the major piece.
Petrography: (K. Guo, *ROM*): Chondrules (0.1-2 mm) make up 60-70% of the thin section. The chondrule textures consist of 30-40% porphyritic olivine-pyroxene, 15-20% porphyritic olivine, 5-7% radial pyroxene, 3-5% barred olivine, and 1-3% granular. The matrix is fine to medium grained (0.2-2 mm). Metal and sulfides are 10-15% in volume. Opaque veins, millimeters to centimeters in length, up to 40 μm in width are present. The majority of olivine grains exhibit undulose extinction and a few contain planar fractures. Approximately 40% of metal and sulfides are oxidized.
Geochemistry: Olivine: $Fa_{18.9\pm1.0}$ (N=45), low-Ca pyroxene: $Fs_{16.2\pm0.7}$ (N=48), $Fs_{16}En_{82}Wo_{1.}$
Classification: Ordinary chondrite H5, S3, W2.
Specimens: A total of 362.91 g is on deposit at *ROM*

Northwest Africa 7451 (NWA 7451)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Ordinary chondrite (L6, melt breccia)
History: Purchased by *Aaronson* in 2011 November in Temara, Morocco.
Petrography: Fairly fresh specimen composed of clasts of L6 chondrite material containing rare chondrules within a in a shock darkened matrix containing ragged, variably-sized grains of Fe-Ni metal. Olivine, orthopyroxene, pigeonite, subcalcic augite, sodic plagioclase, chromite, stained kamacite and troilite.
Geochemistry: Olivine ($Fa_{24.2\text{-}24.4}$), orthopyroxene ($Fs_{20.4\text{-}22.3}Wo_{1.6\text{-}3.3}$), pigeonite ($Fs_{16.4}Wo_{18.8}$), subcalcic augite ($Fs_{11.4}Wo_{34.9}$).
Classification: Ordinary chondrite (L6-melt breccia).

Northwest Africa 7452 (NWA 7452)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Ordinary chondrite (L5)
History: Purchased by Adam Aaronson in 2011 November in Temara, Morocco.
Petrography: Sparse chondrules. Olivine, orthopyroxene, subcalcic augite, augite, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{23.5\text{-}23.7}$), orthopyroxene ($Fs_{19.3\text{-}20.1}Wo_{1.8\text{-}1.0}$), subcalcic augite ($Fs_{12.9}Wo_{28.7}$), augite ($Fs_{7.7}Wo_{44.9}$).
Classification: Ordinary chondrite (L5).

Northwest Africa 7453 (NWA 7453)
(Northwest Africa)
Purchased: 2012 Aug
Classification: HED achondrite (Eucrite)
History: Purchased in Temara, Morocco by Adam *Aaronson* in August 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh basaltic eucrite breccia (monomict) with closely-packed clasts. Minerals are exsolved pigeonite, calcic plagioclase, accessory ilmenite, chromite and troilite.
Geochemistry: Orthopyroxene host ($Fs_{60.7\text{-}61.5}Wo_{2.6\text{-}2.2}$), clinopyroxene exsolution lamellae ($Fs_{26.9\text{-}27.6}Wo_{43.2\text{-}41.8}$).
Classification: Eucrite
Specimens: 20.9 g of sample and one polished thin section are on deposit at *UWB*. *Aaronson* holds the main mass.

Northwest Africa 7454 (NWA 7454)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Carbonaceous chondrite (CV3)
History: Purchased in Temara, Morocco by *Aaronson* in August 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Composed of abundant, mostly rounded chondrules with less abundant amoeboid olivine aggregates (AOA) and irregular, fine-grained CAI in a deep reddish-brown matrix. Minerals identified in CAI include spinel, gehlenite, ulvöspinel, Al-Ti-diopside and rare Pt-bearing fremdlinge.
Geochemistry: Olivine ($Fa_{1.9\text{-}15.4}$), orthopyroxene ($Fs_{1.1\text{-}1.2}Wo_{0.9\text{-}1.1}$), subcalcic augite ($Fs_{1.1\text{-}3.5}Wo_{32.1\text{-}34.0}$).
Classification: Carbonaceous chondrite (CV3).

Northwest Africa 7455 (NWA 7455)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Ordinary chondrite (H4)
History: Purchased by Adam Aaronson in 2011 November in Temara, Morocco.
Petrography: Closely-packed, small chondrules. Olivine, orthopyroxene, subcalcic augite, augite, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{20.0\text{-}20.2}$), orthopyroxene ($Fs_{16.5\text{-}17.2}Wo_{1.3\text{-}0.9}$), subcalcic augite ($Fs_{8.9\text{-}9.7}Wo_{38.0\text{-}35.4}$), augite ($Fs_{7.4}Wo_{46.5}$).
Classification: Ordinary chondrite (H4).

Northwest Africa 7456 (NWA 7456)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Ordinary chondrite (L5)
History: Purchased by Adam Aaronson in 2011 November in Temara, Morocco.
Petrography: Sparse chondrules. Olivine, orthopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{24.5\text{-}24.9}$), orthopyroxene ($Fs_{20.5\text{-}21.0}Wo_{1.7\text{-}1.1}$).
Classification: Ordinary chondrite (L5).

Northwest Africa 7457 (NWA 7457)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Ordinary chondrite (L5, melt breccia)

History: Purchased by *Aaronson* in 2011 November in Temara, Morocco.
Petrography: Clasts of L5 chondrite material containing sparse chondrules are present within a shock-darkened matrix containing ragged, variably-sized grains of Fe-Ni metal. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{25.3\text{-}25.4}$), orthopyroxene ($Fs_{20.2\text{-}20.6}Wo_{1.3\text{-}1.4}$), clinopyroxene ($Fs_{7.4\text{-}8.1}Wo_{45.1\text{-}43.7}$).
Classification: Ordinary chondrite (L5-melt breccia).

Northwest Africa 7458 (NWA 7458)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Ordinary chondrite (L5, melt breccia)
History: Purchased by *Aaronson* in 2011 November in Temara, Morocco.
Petrography: Fairly fresh specimen composed of L5 chondrite clasts containing sparse chondrules within a shock-darkened matrix containing ragged, variably-sized grains of Fe-Ni metal. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, stained kamacite and troilite.
Geochemistry: Olivine ($Fa_{24.8\text{-}25.4}$), orthopyroxene ($Fs_{20.6\text{-}21.1}Wo_{1.4\text{-}1.1}$), clinopyroxene ($Fs_{7.8\text{-}8.7}Wo_{44.5\text{-}43.8}$).
Classification: Ordinary chondrite (L5-melt breccia).

Northwest Africa 7459 (NWA 7459)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Ordinary chondrite (LL4)
History: Purchased by Adam Aaronson in 2011 November in Temara, Morocco.
Petrography: Well-developed, medium-sized chondrules. Olivine (with relict magnesian cores), orthopyroxene, subcalcic augite, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{27.2\text{-}27.9}$; relict magnesian cores $Fa_{10.7}$), orthopyroxene ($Fs_{23.3}Wo_{0.4}$; $Fs_{18.7}Wo_{0.5}$), subcalcic augite ($Fs_{13.8\text{-}15.1}Wo_{33.9\text{-}28.6}$).
Classification: Ordinary chondrite (LL4).

Northwest Africa 7460 (NWA 7460)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Ordinary chondrite (L4)
History: Purchased by Adam Aaronson in 2011 November in Temara, Morocco.
Petrography: Fresh specimen with well-developed chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, kamacite and troilite.
Geochemistry: Olivine ($Fa_{23.4\text{-}23.6}$), orthopyroxene ($Fs_{19.9}Wo_{1.1}$; some magnesian cores $Fs_{7.7}Wo_{0.4}$), clinopyroxene ($Fs_{7.4\text{-}8.5}Wo_{45.5\text{-}41.1}$).
Classification: Ordinary chondrite (L4).

Northwest Africa 7461 (NWA 7461)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Carbonaceous chondrite (CK4)
History: Purchased in Temara, Morocco by Adam Aaronson in August 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fairly fresh specimen with separated, well-developed chondrules containing grains of Cr-magnetite in a fine-grained matrix. Minerals are olivine, orthopyroxene, pigeonite, subcalcic augite, augite, intermediate plagioclase, Cr-magnetite, altered Ni-poor kamacite and pentlandite.
Geochemistry: Olivine ($Fa_{27.8\text{-}28.1}$, n=3), orthopyroxene ($Fs_{24.3}Wo_{0.6}$), pigeonite ($Fs_{16.6}Wo_{23.2}$), subcalcic augite ($Fs_{12.3}Wo_{34.0}$), augite ($Fs_{7.5}Wo_{46.3}$).

Classification: Carbonaceous chondrite (CK4).

Northwest Africa 7462 (NWA 7462)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Ordinary chondrite (L4)
History: Purchased by Adam Aaronson in 2011 November in Temara, Morocco.
Petrography: Fresh specimen with well-developed chondrules. Olivine, orthopyroxene, subcalcic augite, sodic plagioclase, chromite, stained kamacite and troilite.
Geochemistry: Olivine ($Fa_{24.0\text{-}24.1}$), orthopyroxene ($Fs_{19.1\text{-}20.2}Wo_{1.8\text{-}3.2}$), subcalcic augite ($Fs_{11.3\text{-}12.1}Wo_{36.6\text{-}32.6}$).
Classification: Ordinary chondrite (L4).

Northwest Africa 7464 (NWA 7464)
(Northwest Africa)
Purchased: 2012 Jul
Classification: HED achondrite (Diogenite)
History: Purchased from a Moroccan dealer by Gary Fujihara, Tomek Jakubowski and Adam Bates in July 2012.
Physical characteristics: Among the various stones constituting this find, most are extremely fresh, but some have iron oxide staining (presumably as a result of variable distribution and degree of weathering of accessory iron metal).
Petrography: (A. Irving and S. Kuehner, *UWS*) Texturally, the material consists of larger crystal fragments in a matrix of finer, angular grains of the same minerals – this could be termed a matrix-poor breccia, cataclastic or mortar texture. The predominant mineral is orthopyroxene accompanied by accessory olivine, clinopyroxene, anorthite, chromite, Ni-poor metal (more stained in some stones) and troilite.
Geochemistry: Orthopyroxene ($Fs_{24.7\text{-}25.5}Wo_{3.7\text{-}3.4}$; FeO/MnO = 27-31), olivine ($Fa_{25.1}$; $Fa_{28.3}$; FeO/MnO = 48-50), clinopyroxene ($Fs_{10.4}Wo_{43.4}$; FeO/MnO = 22).
Classification: Diogenite
Specimens: 28.3 g of sample and one polished thin section are on deposit at *UWB*. The remaining material is held jointly by Gary Fujihara, Tomasz Jakubowski and Adam Bates.

Northwest Africa 7465 (NWA 7465)
(Northwest Africa)
Purchased: 2012 July
Classification: HED achondrite (Eucrite, monomict)
History: Purchased from a Moroccan dealer by Gary Fujihara and Adam Bates in July 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very fresh monomict breccia composed of closely-packed, fine-grained basaltic eucrite clasts. This specimen is relatively well-annealed, and contains discrete grains of orthopyroxene and clinopyroxene, with anorthitic plagioclase, ilmenite, Ti-rich chromite and troilite.
Geochemistry: Orthopyroxene ($Fs_{58.6\text{-}61.3}Wo_{5.1\text{-}1.7}$; FeO/MnO = 34-35), clinopyroxene ($Fs_{25.3\text{-}25.7}Wo_{44.0\text{-}44.2}$; FeO/MnO = 33-34).
Classification: Eucrite (monomict breccia)
Specimens: 27.2 g of sample and one polished thin section are on deposit at *UWB*. The remaining material is held jointly by Gary Fujihara and Adam Bates.

Northwest Africa 7466 (NWA 7466)
(Northwest Africa)
Purchased: 2012 Jul

Classification: HED achondrite (Eucrite, monomict)
History: Purchased from a Moroccan dealer by Gary Fujihara and Adam Bates in July 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh monomict breccia composed of medium-grained basaltic eucrite clasts. Minerals are exsolved pigeonite, calcic plagioclase, silica polymorph, ilmenite, chromite and troilite.
Geochemistry: Orthopyroxene $Fs_{61.1\text{-}62.3}Wo_{1.7}$; FeO/MnO = 31), clinopyroxene exsolution lamellae ($Fs_{26.9\text{-}27.6}Wo_{43.2\text{-}41.8}$; FeO/MnO = 28-29).
Classification: Eucrite (monomict breccia)
Specimens: 27.9 g of sample and one polished thin section are on deposit at *UWB*. The remaining material is held jointly by Gary Fujihara and Adam Bates.

Northwest Africa 7467 (NWA 7467)
(Northwest Africa)
Purchased: 2012 Jul
Classification: HED achondrite (Diogenite, polymict)
History: Purchased from a Moroccan dealer by Gary Fujihara in July 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh, complex polymict breccia composed of >90 vol.% crystal fragments derived from several types of diogenitic orthopyroxenes. Contains minor amounts of exsolved pigeonite, calcic plagioclase, magnesian and ferroan olivine, rare ferropigeonite, chromite, ilmenite, troilite and stained metal. There also are less abundant lithic clasts of basaltic to quench-textured eucrites and dark-matrix microbreccias, plus sparse, broken spherical grains of pinkish-tan glass.
Geochemistry: Diogenitic orthopyroxene ($Fs_{20.2}Wo_{0.6}$; $Fs_{29.4}Wo_{4.9}$; $Fs_{34.4}Wo_{2.7}$; FeO/MnO = 28-30), orthopyroxene ($Fs_{51.1}Wo_{4.6}$); FeO/MnO = 30), clinopyroxene ($Fs_{24.8\text{-}27.9}Wo_{40.5\text{-}39.0}$); FeO/MnO = 29), ferropigeonite ($Fs_{76.1}Wo_{13.8}$; FeO/MnO = 22), olivine ($Fa_{18.3}$; FeO/MnO = 64), ferroan olivine ($Fa_{59.8}$; FeO/MnO = 47).
Classification: Diogenite (polymict breccia).
Specimens: 21.4 g of sample and one polished thin section are on deposit at *UWB*. G. Fujihara holds the main mass.

Northwest Africa 7468 (NWA 7468)
(Northwest Africa)
Purchased: 2012 May
Classification: Ordinary chondrite (L3)
History: Purchased by Gary Fujihara in February 2012 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: Well-formed, medium-sized (~0.4 to 0.7 mm) chondrules. Olivine, orthopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{0.6\text{-}31.2}$; Cr_2O_3 in ferroan examples is 0.03-0.08 wt.%, mean 0.05 wt.%, s.d. 0.02 wt.%, N = 6), orthopyroxene ($Fs_{4.8\text{-}15.0}Wo_{0.3\text{-}0.6}$).
Classification: Ordinary chondrite (L3).

Northwest Africa 7469 (NWA 7469)
(Northwest Africa)
Purchased: 2012 Jun
Classification: Ordinary chondrite (L3)
History: Purchased by Gary Fujihara in February 2012 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: Closely packed, well-formed, medium-sized chondrules. Olivine, orthopyroxene, sodic plagioclase, chromite, altered kamacite, troilite and taenite. One unusual grain of Al-Ti-bearing hedenbergite was found.

Geochemistry: Olivine ($Fa_{2.2-47.7}$; Cr_2O_3 in ferroan examples is 0.05-0.83 wt.%, mean 0.26 wt.%, s.d. 0.30 wt.%, N = 7), orthopyroxene ($Fs_{1.1-56.7}Wo_{0.9-0.3}$), hedenbergite ($Fs_{46.6}Wo_{50.1}$, Al_2O_3 = 5.3 wt.%, TiO_2 = 2.7 wt.%).
Classification: Ordinary chondrite (L3.1). Estimated subtype based on wide Cr_2O_3 range in ferroan olivine (Grossman and Brearley 2005, Fig. 15).

Northwest Africa 7471 (NWA 7471)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Carbonaceous chondrite (CO3)
History: Purchased by *GHupé* in August 2012 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Composed of very small, well-formed chondrules and some CAI in a deep brown, fine-grained matrix.
Geochemistry: Olivine ($Fa_{0.4-71.7}$; Cr_2O_3 in ferroan olivine = 0.10-0.36 wt.%, mean 0.22 wt.%, s.d. 0.09, N = 8), orthopyroxene ($Fs_{1.1-13.6}Wo_{1.1-2.5}$), subcalcic augite ($Fs_{2.2}Wo_{31.8}$; $Fs_{1.6}Wo_{37.7}$), augite ($Fs_{1.0-2.3}Wo_{44.7-48.6}$).
Classification: Carbonaceous chondrite (CO3).

Northwest Africa 7472 (NWA 7472)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Carbonaceous chondrite (CK5)
History: Purchased by *GHupé* in August 2012 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Sparse, medium-sized chondrules composed mainly of olivine with grains of Cr-magnetite. Minerals are olivine, clinopyroxene, calcic plagioclase, Cr-magnetite and Ni-rich pentlandite.
Geochemistry: Olivine ($Fa_{33.8-33.9}$; FeO/MnO = 104-128), clinopyroxene ($Fs_{8.9-9.5}Wo_{47.0-46.8}$).
Classification: Carbonaceous chondrite (CK5).

Northwest Africa 7473 (NWA 7473)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Ureilite
History: Purchased in Temara, Morocco by Adam Aaronson in August 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Protogranular aggregate of olivine and pigeonite. Fine-grained metal occurs within the reduced rims of olivine grains.
Geochemistry: Olivine (cores $Fa_{22.3-22.4}$; Cr_2O_3 = 0.75 wt.%; rims $Fa_{7.5}$; Cr_2O_3 = 0.63 wt.%), pigeonite ($Fs_{17.9-18.3}Wo_{6.9-6.6}$).
Classification: Ureilite
Specimens: 20.4 g of sample and one polished thin section are on deposit at *UWB*. *Aaronson* holds the main mass.

Northwest Africa 7474 (NWA 7474)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Primitive achondrite (Lodranite)
History: Purchased in Temara, Morocco by Adam Aaronson in August 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Coarse-grained protogranular aggregate (grain size 0.4-1.2 mm) of olivine, orthopyroxene, clinopyroxene and ~18 vol.% stained kamacite (as holly-leaf-shaped grains).

Geochemistry: Olivine ($Fa_{13.5-13.6}$; FeO/MnO = 25-27), orthopyroxene ($Fs_{12.3-12.5}Wo_{2.8-2.3}$; FeO/MnO = 16-17), clinopyroxene ($Fs_{4.8-6.2}Wo_{44.5-39.2}$; FeO/MnO = 9-12).
Classification: Lodranite
Specimens: 20.7 g of sample and one polished thin section are on deposit at *UWB*. *Aaronson* holds the main mass.

Northwest Africa 7475 (NWA 7475)
(Northwest Africa)
Purchased: 2012 Sep
Classification: Martian meteorite (basaltic breccia)
History: Purportedly recovered at the find site for NWA 7034 near Bir Anzarane, southern Morocco in 2012 and purchased by Luc Labenne from a Moroccan dealer in September 2012.
Physical characteristics: Black, partly fusion-crusted stone (80.2 g) consisting of black and white angular clasts plus dark spheroidal objects in a black matrix.
Petrography: (A. Wittmann, R. Korotev, P. Carpenter and B. Jolliff, *WUSL*; A. Irving and S. Kuehner, *UWS*; D. Moser and I. Barker, *UWO*) Complex breccia composed of angular to rounded mineral clasts, lithic fragments, and spheroidal objects (up to 5 mm in diameter), in a fine grained, dark matrix rich in magnetite. Minerals present include a variety of pyroxenes (orthopyroxene, pigeonite, subcalcic augite, augite and hedenbergite), sodic to intermediate plagioclase, Ti-bearing magnetite, chlorapatite, ilmenite, pyrite, maghemite, hematite, alkali feldspar, anorthoclase, rutile, and monazite. Many clasts exhibit 50 µm-thick mantles of concentrically aligned, accreted debris >5 µm in size. Clast types range from monomineralic feldspar and pyroxene fragments <1 mm size to polymineralic clasts that are aphanitic-glassy (some with igneous contacts to the host matrix). Crystallized melt clasts have textures ranging from sub-ophitic to ophitic, granular and poikilitic with grain sizes of plagioclase and pyroxene <0.5 mm. Some spheroidal objects are composed of glass or fine grained quench assemblages, whereas others consist of concentrically zoned grain aggregates with radial shrinkage fractures.
Geochemistry: (A. Wittmann, *WUSL*; S. Kuehner, *UWS*) Orthopyroxene ($Fs_{19-48}Wo_{1-5}$, FeO/MnO = 27-45; n = 38), pigeonite ($Fs_{25-44}Wo_{5-19}$, FeO/MnO = 23-45; n = 9), subcalcic augite ($Fs_{17-30}Wo_{29-41}$, FeO/MnO = 17-41; n = 18), augite ($Fs_{9-18}Wo_{45-49}$, FeO/MnO = 18-61; n = 5), hedenbergite ($Fs_{37-44}Wo_{43-48}$, FeO/MnO = 40-65; n = 2), plagioclase ($An_{10-58}Or_{1.9-6.8}$; n = 35), alkali feldspar ($An_{0.8-13}Or_{53-90}Cn1$-6; n = 10), anorthoclase ($An_{22-26}Or_{10-20}$; n = 2), magnetite (0.3-16.1 wt.% Cr_2O_3, 0.25-0.38 wt.% NiO; n = 15), ilmenite (3-5 wt.% MgO; n = 8), pyrite (up to 2.8 wt.% Ni; n = 7).
Classification: Martian (basaltic breccia). This specimen is essentially identical in texture and mineralogy to NWA 7034 and NWA 7533, and is evidently paired with those distinctive stones.
Specimens: 16.1 g of type material and one polished thin section are on deposit at *UWB*. The remaining material is held by *Labenne*.

Northwest Africa 7500 (NWA 7500)
Mali
Purchased: 2012 Mar
Classification: Martian meteorite (Shergottite)
History: Found near Taoudenni, Mali and purchased from the finder by Adam Aaronson in March 2012.
Physical characteristics: A 2040 g, rounded, cuboidal stone almost entirely coated by black glossy fusion crust (which has sloughed off some areas). The interior is medium gray, and exhibits visible sparkling maskelynite intergrown with gray pyroxene.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very fresh, medium-grained specimen with intersertal texture composed predominantly of prismatic grains of compositionally zoned clinopyroxene and lath-like grains of intermediate plagioclase (maskelynite). Accessory minerals include ilmenite, ulvöspinel, pyrrhotite, fayalite, chlorapatite, merrillite and rare baddeleyite. Quenched melt inclusions within pyroxene consist of K-Al-Si-rich glass, and are surrounded by radial expansion fractures.

Geochemistry: Pyroxene compositions mimic trends shown by Shergotty, with low-Ca varieties (pigeonite) ranging from $Fs_{27.4\text{-}61.1}Wo_{10.4\text{-}14.0}$ and high-Ca varieties ranging from $Fs_{19.5\text{-}37.0}Wo_{34.5\text{-}32.4.}$
Classification: Martian (shergottite).
Specimens: A total of 23 g of type material and one polished thin section are on deposit at *UWB*. The main mass is held by *Aaronson*.

Northwest Africa 7501 (NWA 7501)
(Northwest Africa)
Purchased: 2012 Sep
Classification: HED achondrite (Eucrite, monomict)
History: Purchased by *GHupé* in September 2012 from a dealer in Zagora, Morocco.
Physical characteristics: Two medium-grained, grayish stones weighing 265.5 g and 450 g.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh unbrecciated, medium-grained specimen (but with finer-grained domains) composed of low-Ca pyroxene (with clinopyroxene exsolution lamellae), clinopyroxene (with orthopyroxene exsolution lamellae), calcic plagioclase, silica polymorph, ilmenite (with sparse tiny inclusions of baddeleyite) and minor stained metal.
Geochemistry: Orthopyroxene ($Fs_{61.7\text{-}62.3}Wo_{4.8\text{-}4.7}$; FeO/MnO = 30-31), clinopyroxene ($Fs_{31.7\text{-}32.6}Wo_{41.0\text{-}40.4}$; FeO/MnO = 34-35).
Classification: Eucrite (diabasic to gabbroic)
Specimens: 20.5 g of sample and one polished thin section are on deposit at *UWB*. *GHupé* holds the main masses.

Northwest Africa 7502 (NWA 7502)
(Northwest Africa)
Purchased: 2012 Oct
Classification: Carbonaceous chondrite (CR2)
History: Purchased by *GHupé* in October 2012 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed round chondrules (mostly very magnesian; some with opaque rims composed of altered kamacite or very fine grained dust aggregates) and rare, small CAI in a deep reddish-brown matrix. The matrix mineralogy is difficult to characterize, but a mineral compositionally resembling cronstedtite was identified as one component. Other minerals are olivine, orthopyroxene, pigeonite, subcalcic augite, spherical kamacite grains and fine grained troilite.
Geochemistry: Olivine ($Fa_{0.5\text{-}33.6}$), orthopyroxene ($Fs_{0.7\text{-}2.4}Wo_{1.0\text{-}0.6}$), pigeonite ($Fs_{2.9}Wo_{24.2}$), subcalcic augite ($Fs_{1.1\text{-}3.1}Wo_{34.1\text{-}29.7}$). Oxygen isotopes (K. Ziegler, *UNM*): analyses of acid-washed subsamples by laser fluorination gave, respectively $\delta^{17}O$ = -0.980, -1.331; $\delta^{18}O$ = 2.058, 1.622; $\Delta^{17}O$ = -2.067, -2.187 per mil (for a TFL slope of 0.528).
Classification: Carbonaceous chondrite (CR2).

Northwest Africa 7503 (NWA 7503)
(Northwest Africa)
Purchased: 2012 Feb
Classification: Ordinary chondrite (L5-6)
History: Purchased by Matthew Matthew in February 2012 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: Breccia composed of different types of equilibrated L chondrite clasts (some with more evident chondrules than others). Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{25.1\text{-}25.3}$), orthopyroxene ($Fs_{20.4\text{-}21.1}Wo_{1.4}$), clinopyroxene ($Fs_{6.7\text{-}7.8}Wo_{45.6\text{-}45.2}$).
Classification: Ordinary chondrite (L5-6).

Northwest Africa 7504 (NWA 7504)

(Northwest Africa)
Purchased: 2012 Feb
Classification: Ordinary chondrite (L6)
History: Purchased by Matthew Matthew in February 2012 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: Mostly recrystallized with very sparse, medium-sized chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{25.0\text{-}25.6}$), orthopyroxene ($Fs_{20.7\text{-}21.1}Wo_{1.6\text{-}1.4}$), clinopyroxene ($Fs_{7.0\text{-}8.6}Wo_{45.9\text{-}44.0}$).
Classification: Ordinary chondrite (L6).

Northwest Africa 7521 (NWA 7521)
(Northwest Africa)
Purchased: 2010 Feb
Classification: Ordinary chondrite (L6, melt breccia)
History: Purchased by Matthew Matthew in February 2010 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: Sparse, small L6 chondrite clasts (containing rare chondrules) are present in a dominant, almost opaque matrix rich in dispersed irregular grains of altered metal. Olivine, orthopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{23.3\text{-}23.5}$), orthopyroxene ($Fs_{19.5\text{-}19.6}Wo_{1.8\text{-}1.6}$).
Classification: Ordinary chondrite (L6-melt breccia).

Northwest Africa 7534 (NWA 7534)
Morocco
Purchased: Aug 2012
Classification: Ordinary chondrite (H6, melt breccia)
History: Purchased by Adam Bates from a Moroccan meteorite dealer, August 2012.
Physical characteristics: Single stone, dark, rough exterior. Sawn surface shows two distinct textures: melted and unmelted. Melted portion contains fine blebs of metal and sulfide, but some up to 3 mm, set in a microcrystalline groundmass. Umelted portion contains fine-grained metal/sulfide set in a dark, coarser crystalline groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows two main domains: 1) melted domain consisting of very fine-grained silicate quench crystals hosting scattered 50-100 μm, Mg-rich, olivine and pyroxene crystals, and metal and sulfide blebs, 2) unmelted H6 chondrite domain with a few equilibrated indistinct chondrules; ubiquitous plagioclase, kamacite, troilite, and chromite.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine $Fa_{18.2\pm0.0}$, Fe/Mn=41±3, n=2; orthopyroxene $Fs_{16.3\pm0.0}Wo_{1.6\pm0.2}$, Fe/Mn=25±1, n=2.
Classification: H6-melt breccia, weathering grade W2.
Specimens: 21 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7535 (NWA 7535)
Northwest Africa
Purchased: 2011 Nov
Classification: Rumuruti chondrite (R3-6)
Petrography: (K. Metzler, *IfP*): Genomict breccia, consisting of chondrules, chondrule fragments, and a few chondritic lithic clasts set in a brownish clastic matrix. Chondritic lithic clasts of petrologic type 6 and unequilibrated olivine fragments (Fa_0, Fa_7, Fa_{21}; not included in the statistics) were found. The sulfides are heavily oxidized.

Northwest Africa 7536 (NWA 7536)
Northwest Africa

Purchased: 2012 Mar
Classification: HED achondrite (Howardite)

Petrography: (K. Metzler, *IfP*): Polymict breccia, consisting of mineral fragments and a few lithic clasts set in a fine-grained clastic matrix. Mineral fragments include various eucritic pyroxenens (some with augite exsolution lamellae), feldspar (mostly maskelynite), silica, chromite, ilmenite, troilite, and Ni-poor metal. Two olivine grains were found. Lithic clasts include cumulate eucrites, granulites, granulitic breccias, and melt rocks (clast-poor and clast-rich). Breccia-in breccia textures occur. About 20 vol% diogenitic components. $An_{89.6\pm4.5}$ (n=21)

Northwest Africa 7537 (NWA 7537)
Northwest Africa
Purchased: 2012 May
Classification: HED achondrite (Howardite)

Petrography (K. Metzler, *IfP*): Polymict breccia consisting of mineral fragments and a few lithic clasts set in a fine-grained clastic matrix. Mineral fragments include various eucritic pyroxenes (some with augite exsolution lamellae), diogenitic pyroxenes, feldspar, silica, chromite, ilmenite, troilite, and Ni-poor metal. One olivine fragment found. Lithic clasts include ophitic, subophitic, and fan-spherulitic eucrites, diogenites and small melt rock clasts. The metal is well-preserved. About 50 vol% diogenitic components. $An_{88.0\pm5.7}$ (n=22)

Northwest Africa 7542 (NWA 7542)
Northwest Africa
Purchased: 2012 Jun 21
Classification: HED achondrite (Eucrite, polymict)

Petrography: (K. Metzler, *IfP*) Polymict breccia consisting of a large variety of eucritic lithic clasts with sizes up to 3 cm and mineral fragments (plagioclase, pyroxene) set in a fine-grained, gray matrix. Lithic clasts with ophitic and subophitic textures are observed. Most pyroxenes exhibit augite exsolution lamellae. Dark melt rock clasts occur. Accessories are silica, ilmenite, chromite, troilite, and Ni-poor metal. Contains angular carbonaceous chondrite clasts up to 1.5 mm.
Geochemistry: $An_{89.4\pm5.1}$ ($An_{83\text{-}98}$; n=10)
Classification: Polymict eucrite

Northwest Africa 7543 (NWA 7543)
Northwest Africa
Purchased: 2012 Jun 21
Classification: HED achondrite (Eucrite, polymict)

Petrography: (K. Metzler, *IfP*) Polymict breccia consisting of eucritic lithic clasts up to 2.5 cm with subophitic to granulitic textures and mineral fragments (pyroxene, plagioclase) set in a fine-grained, light gray matrix. Less than 10 vol% diogenitic low-Ca pyroxene fragments occur. Some dark melt rock clasts are observed. Most pyroxenes exhibit augite exsolution lamellae, but fragments of unequilibrated pyroxene can also be found. Accessories are silica, ilmenite, chromite, troilite and low-Ni metal.
Geochemistry: Plagioclase compositions: $An_{88.3\pm5.1}$ ($An_{82\text{-}97}$; n=13). Diogenitic pyroxene fragment: $En_{71}Fs_{26}Wo_3$
Classification: Polymict eucrite

Northwest Africa 7549 (NWA 7549)
Northwest Africa
Purchased: 2012
Classification: HED achondrite (Eucrite, monomict)

Physical characteristics: Very fresh fusion crust with light-gray interior.

Petrography: Monomict subophitic basaltic breccia with thin glassy shock-melt veins interstial to mostly cm-size breccia fragments. This stone contains orthopyroxene, augite, chromite, metal, silica, and FeS.
Geochemistry: Orthopyroxene, $Fs_{55.2}Wo_{4.5}$; augite, $Fs_{30.1}Wo_{42}$; plagioclase, $An_{90.4}$; chromite Cr/[Cr +Al] = 0.78.
Classification: Achondrite (eucrite, monomict)
Specimens: A total of 13 g are on deposit at *PSF*, the main mass is held by D. *Gregory*

Northwest Africa 7550 (NWA 7550)
Morocco
Purchased: 2012
Classification: Carbonaceous chondrite (CK4)
Physical characteristics: Moderately fresh fusion crust with friable white to gray interior.
Petrography: Well-defined chondrules.
Geochemistry: Olivine, $Fa_{33.1}$ (FeO/MnO = 95); orthopyroxene, $Fs_{24.7}Wo_{2.1}$; magnetite Cr_2O_3 = 4.1 wt %.
Classification: CK4
Specimens: A total of 21 g are at *PSF*, *Gregory* holds the main mass

Northwest Africa 7551 (NWA 7551)
Morocco
Purchased: 2012
Classification: HED achondrite (Eucrite, monomict)
Physical characteristics: Moderately well-preserved fusion crust that covers ~65 % of the surface.
Petrography: Partially crushed cataclastic cumulate eucrite breccia with protogranular texture of equal amounts of pyroxenes, and plagioclase with minor FeS, chromite, and silica.
Geochemistry: Pigeonite, $Fs_{54.5}Wo_{13.2}$ (FeO/MnO = 41); augite $Fs_{34.3}Wo_{41.4}$; plagioclase, $An_{90.2}$; chromite Cr/(Cr+Al) = 0.80.
Classification: Achondrite (eucrite, monomict)
Specimens: 21.9 g are at *PSF*; *Gregory* holds the main mass.

Northwest Africa 7552 (NWA 7552)
Morocco
Purchased: 2012
Classification: HED achondrite (Eucrite, monomict)
Physical characteristics: Single stone with fresh fusion crust.
Petrography: Monomict fine-grained (<2 mm) cumulate eucrite breccia. Contains orthopyroxene with augite lamellae, augite, plagioclase, ilmenite and FeS.
Geochemistry: Orthopyroxene, $Fs_{50.5}Wo_{4.5}$; augite, $Fs_{34.4}Wo_{43.0}$; plagioclase, $An_{89.}$
Classification: Achondrite (eucrite, monomict)
Specimens: 21.7 g at *PSF*; *Gregory* holds the main mass.

Northwest Africa 7555 (NWA 7555)
Morocco
Purchased: 2012
Classification: HED achondrite (Eucrite)
Physical characteristics: Little remaining fusion crust with moderate iron staining; dark interior with few remnant basaltic clasts.
Petrography: Highly shocked subophitic eucrite clasts enclosed by an extensive shock melt-quenched matrix, which consists of bladed and spherulitic plagioclase (0.1 to 1.2 mm), set in fine-grained (<0.03 mm) masses of plagioclase, ilmenite, and pyroxenes.
Geochemistry: Subophitic orthopyroxene, $Fs_{53}Wo_{4.8}$ (FeO/MnO = 36); plagioclase, $An_{91.}$ Quenched matrix pigeonite, $Fs_{48.4}Wo_{14}$ (FeO/MnO = 26); plagioclase, $An_{88.}$

Classification: Achondrite (eucrite)
Specimens: 24.5 g on deposit at *PSF*, *Gregory* hold the main mass.

Northwest Africa 7571 (NWA 7571)
(Northwest Africa)
Purchased: 2012
Classification: HED achondrite (Eucrite, polymict)
Petrography: The gray rock consists of basaltic and melt clast set in a fine-grained clastic matrix of dominantly calcic plagioclase and exsolved pyroxene. SiO_2 polymorphs are quite abundant. Accessories include chromite, troilite and rare FeNi metal.
Geochemistry: opx: $Fs_{26.5\text{-}59.1}Wo_{1.4\text{-}4.6}$; FeO/MnO=28-37; cpx: $Fs_{17.8\text{-}25.6}Wo_{39.1\text{-}43.3}$; FeO/MnO=25-31

Northwest Africa 7573 (NWA 7573)
(Northwest Africa)
Purchased: 2012
Classification: Carbonaceous chondrite (CK3)
Petrography: Clearly discernible chondrules and abundant irregularly shaped CAIs set in a greenish-grayish groundmass. Chondrules often contain clear glass. Magnetite is dispersed in the fine-grained matrix and metal is virtually absent. Opaque phases dominated by Cr-rich magnetite. FeS uncommon. CAIs less abundant that in CV3 chondrites and also a high matrix/chondrule ratio argues for CK.

Northwest Africa 7574 (NWA 7574)
(Northwest Africa)
Purchased: 2012
Classification: HED achondrite (Eucrite, polymict)
Petrography: The meteorite displays a fresh greyish interior with easily discernable basaltic and dark melt clasts set in a fine-grained groundmass. Some larger pyroxene fragments also occur. The matrix is intensely fracture and the meteorite shows strong shock effects, e.g. plagioclase is partly to totally converted into maskelynite.
Geochemistry: opx: $Fs_{25.1\text{-}41.7}Wo_{1.9\text{-}3.1}$; FeO/MnO=30-38; cpx: $Fs_{16.2\text{-}21.1}Wo_{35.9\text{-}45.2}$; FeO/MnO=23-27

Northwest Africa 7576 (NWA 7576)
(Northwest Africa)
Purchased: 14 Dec 2011
Classification: HED achondrite (Howardite)
Petrography: Brecciated meteorite containing abundant diogenetic and subordinate coarse-grained basaltic eucrite clasts set in a fine-grained clastic matrix. Rarely dark cryptocrystalline melt clasts are encountered. Basaltic clasts are composed of exsolved pyroxene, calcic plagioclase and abundant silica polymorphs. Accessory minerals include troilite and chromite. Plagioclase and pyroxene display weak undulatory extinction due to low degree of shock metamorphism.
Geochemistry: Diogenitic orthopyroxene $Fs_{22.2\text{-}30.1}Wo_{1.3\text{-}4.6}$, FeO/MnO=22-33; low-Ca pyroxene host $Fs_{26.8\text{-}57.3}Wo_{2.7\text{-}6.5}$, FeO/MnO=26-33; augite exsolution lamellae $Fs_{28\text{-}28.2}Wo_{41.7\text{-}41.9}$, FeO/MnO=31-34; calcic plagioclase $An_{87.1}$, range $An_{76.8\text{-}93}$.

Northwest Africa 7589 (NWA 7589)
(Northwest Africa)
Purchased: 2012
Classification: Carbonaceous chondrite (CV3)
Petrography: The brownish meteorite is composed of 1-mm-sized chondrules, CAIs, and olivine amoeboids set into a black matrix; rare CAIs up to 1 cm sized are present. Many chondrules show reddish staining due to oxidation of metal.

Northwest Africa 7599 (NWA 7599)
(Northwest Africa)
Purchased: 2012
Classification: HED achondrite (Diogenite)
History: Purchased by Stefan Ralew in 2012 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Composed of larger grains separated by regions of smaller crushed grains in a cataclastic or mortar texture. Predominantly orthopyroxene with accessory clinopyroxene, anorthite, large chromite grains, stained Ni-poor metal and troilite.
Geochemistry: Orthopyroxene ($Fs_{24.8-24.9}Wo_{3.0-3.5}$, FeO/MnO = 30-34), clinopyroxene ($Fs_{10.4}Wo_{42.8}$, FeO/MnO = 22).
Classification: Diogenite. Even though the examined thin section does not contain olivine, this material is virtually identical in terms of texture, pyroxene compositions and alteration to the NWA 7464 stones (and probably is paired with them).
Specimens: 20.1 g of sample and one polished thin section are on deposit at *UWB*. The remaining material is held by *Ralew*.

Northwest Africa 7600 (NWA 7600)
(Northwest Africa)
Purchased: 2012
Classification: Ureilite
History: Purchased by Stefan Ralew in 2012 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Mostly a medium- to coarse-grained protogranular aggregate of olivine (reduced metal-bearing rims) and low-Ca pyroxene, but with finer grained, recrystallized regions exhibiting triple grain junctions. Minor staining of silicates by iron hydroxides.
Geochemistry: Olivine (cores $Fa_{17.6-17.9}$, Cr_2O_3 = 0.63 wt.%; rims $Fa_{9.1}$), low-Ca pyroxene ($Fs_{15.0-15.2}Wo_{4.5-4.6}$).
Classification: Ureilite
Specimens: 14.7 g of sample and one polished thin section are on deposit at *UWB*. *Ralew* holds the main mass.

Northwest Africa 7601 (NWA 7601)
(Northwest Africa)
Purchased: 2012
Classification: Primitive achondrite (Acapulcoite)
History: Purchased by Stefan Ralew in 2012 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively fine grained and equigranular (grain size 0.1-0.5 mm) with abundant triple grain junctions among silicate minerals. Composed of olivine, orthopyroxene, clinopyroxene, intermediate plagioclase, altered kamacite, chlorapatite, troilite and minor schreibersite. Moderate terrestrial alteration has produced secondary veinlets of goethite and calcite.
Geochemistry: Olivine ($Fa_{11.1-11.2}$, FeO/MnO = 23-24), orthopyroxene ($Fs_{11.2-12.1}Wo_{2.7-3.1}$, FeO/MnO = 14), clinopyroxene ($Fs_{5.2-6.3}Wo_{47.1-45.3}$, FeO/MnO = 10-13).
Classification: Acapulcoite
Specimens: 12.2 g of sample and one polished thin section are on deposit at *UWB*. *Ralew* holds the main mass.

Northwest Africa 7602 (NWA 7602)
(Northwest Africa)
Purchased: 2012
Classification: Enstatite chondrite (EL6)
History: Purchased by *Ralew* in 2012 from a dealer in Erfoud, Morocco.

Physical characteristics: A single brown stone with sparse metal visible in the interior.
Petrography: (A. Irving & S. Kuehner, *UWS*) Recrystallized with no obvious chondrules. Predominantly enstatite with Cr-Ti-bearing troilite, metal (low in Si) and sodic plagioclase. Fairly abundant secondary iron hydroxides around metal grains and along grain boundaries.
Geochemistry: Enstatite ($Fs_{0.1\text{-}0.2}Wo_{0.6\text{-}0.7}$)
Classification: EL6 chondrite.
Specimens: A total of 14.4 g of type material and one polished thin section are on deposit at *UWB*. The remaining material is held by *Ralew*.

Northwest Africa 7603 (NWA 7603)
(Northwest Africa)
Purchased: 2012
Classification: Enstatite achondrite
History: Purchased by *Ralew* in 2012 from a dealer in Erfoud, Morocco.
Physical characteristics: A single brown 126.9 g stone with abundant metal visible in the interior.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively coarse grained aggregate (grainsize up to 1.1 mm) with triple grain junction texture composed predominantly of enstatite with accessory Cr-bearing troilite, altered kamacite, taenite and intermediate plagioclase. Secondary goethite and minor calcite occur along grain boundaries.
Geochemistry: Enstatite ($Fs_{0.1\text{-}0.2}Wo_{0.6\text{-}0.8}$).
Classification: Enstatite achondrite.
Specimens: A total of 20 g of type material and one polished thin section are on deposit at *UWB*. The remaining material is held by *Ralew*.

Northwest Africa 7605 (NWA 7605)
Northwest Africa
Purchased: 2012
Classification: Primitive achondrite (Brachinite)
History: Purchased by Stefan Ralew in 2012 from a dealer in Erfoud, Morocco.
Physical characteristics: Dark brown, rounded stone with small areas of remnant fusion crust. Interior slices show the rock to be composed of black, interlocking elongate grains with a preferred orientation, plus elongate, lighter gray-colored oikocrysts (up to 15 mm by 5 mm in size).
Petrography: (A. Irving and S. Kuehner, *UWS*) Composed mostly of olivine with subordinate clinopyroxene, Ti-V-bearing chromite, pyrrhotite and rare kamacite, plus large oikocrysts of orthopyroxene + clinopyroxene enclosing ovoid olivine chadacrysts. All mafic silicates exhibit a strongly-oriented grain shape fabric. Intergrowths of pure iron metal + orthopyroxene are present along olivine grain boundaries and along microfractures within olivine grains.
Geochemistry: Olivine ($Fa_{26.1\text{-}26.2}$, FeO/MnO = 43-49; chadacrysts in pyroxene $Fa_{24.8\text{-}24.9}$, FeO/MnO = 43-52), orthopyroxene (oikocryst $Fs_{25.8}Wo_{2.5}$, FeO/MnO = 39, Cr_2O_3 = 0.2 wt.%; with metal on olivine margins $Fs_{21.8\text{-}21.9}Wo_{1.0\text{-}2.1}$, FeO/MnO = 28-30), clinopyroxene ($Fs_{10.2\text{-}10.6}Wo_{44.0\text{-}47.8}$, FeO/MnO = 23-31, Al_2O_3 = 0.7-0.8 wt.%; Cr_2O_3 = 0.7-0.9.%; oikocryst $Fs_{10.2}Wo_{43.6}$, FeO/MnO = 32, Al_2O_3 = 0.7 wt.%, Cr_2O_3 = 0.7 wt.%). Oxygen isotopes (K. Ziegler, *UNM*): analysis of an acid-washed sample by laser fluorination gave $\delta^{17}O$ = 2.370; $\delta^{18}O$ = 4.822; $\Delta^{17}O$ = -0.176 per mil.
Classification: Brachinite. The mineralogy and oxygen isotopic composition of this specimen are similar to those of other brachinites, but the oriented grain fabric and large pyroxene oikocrysts are unusual.
Specimens: A total of 20 g of material and one polished thin section are on deposit at *UWB*. The main mass is held by *Ralew*.

Northwest Africa 7606 (NWA 7606)
Morocco
Purchased: Aug 2012

Classification: Ordinary chondrite (LL3.4)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, dark weathered fusion crust, saw-cut reveals densely packed chondrules of variable size, scattered very fine grained metal/sulfides.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a numerous unequilibrated chondrules, most 500-1000 μm, range ~100-3000 μm, set in fine-grained groundmass, minor kamacite, troilite, and Fe-oxide.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine $Fa_{19.1\pm10.6}$, range $Fa_{0.4\text{-}37.1}$, Fe/Mn=62±40, Cr_2O_3=0.06±0.04 wt%, n=32; low-Ca pyroxene $Fs_{7.1\pm6.5}Wo_{0.8\pm0.9}$, range $Fs_{0.3\text{-}27.1}$, Fe/Mn=20±15, n=56.
Classification: Ordinary chondrite (LL3.4), mean Fa-content and sigma consistent with type 3.4, low-Ca pyroxene has anomalously low mean Fs-content and high sigma for type 3.4, weathering grade W2.
Specimens: 22 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7607 (NWA 7607)
Morocco
Purchased: Aug 2012
Classification: Ordinary chondrite (LL3.4)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, weathered fusion crust, chondrules visible through surface patina, saw-cut reveals fine-grained metal, many mm-sized chondrules, some up to 3 mm, average 700 μm.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous unequilibrated POP, PO, RP chondrules, most with albitic mesostasis or glass, average chondrule size ~700 μm. Scattered troilite, kamacite, taenite, minor Fe-Ni sulfide; metal is ~50% oxidized.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine $Fa_{23.2\pm11.6}$, Fe/Mn=75±13, n=31; low-Ca pyroxene $Fs_{14.7\pm8.3}Wo_{1.5\pm1.7}$, Fe/Mn=26±13, n=30.
Classification: Ordinary chondrite (LL3.4), weathering grade W2.
Specimens: 21 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7608 (NWA 7608)
Morocco
Purchased: August 2012
Classification: HED achondrite (Diogenite)
History: Purchased by Adam Bates from a Moroccan meteorite dealer, August, 2012.
Physical characteristics: Single fusion-crusted stone. Saw cuts reveal coarsely crystalline texture with pyroxene grains up to 1 cm, light orange, with some scattered green grains up to a few mm.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows approximately 95% pyroxene and 2% plagioclase, plus accessory oxidized metal, chromite, and troilite, minor Cr-rich sulfide. Most pyroxene grains >1 mm, plagioclase up to 300 μm.
Geochemistry: (C. Agee and M. Spilde, *UNM*) EMPA. Low-Ca pyroxene $Fs_{25.3\pm0.5}Wo_{3.3\pm0.3}$, Fe/Mn=31±1, n=11; plagioclase $Or_{0.7}Ab_{16.0}An_{83.3.}$
Classification: Achondrite (diogenite), equilibrated low-Ca pyroxene.
Specimens: 21 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7609 (NWA 7609)
Morocco
Purchased: August 2012
Classification: HED achondrite (Eucrite)
History: Purchased by Adam Bates from a Moroccan meteorite dealer, August, 2012.
Physical characteristics: Single fusion-crusted stone. Saw cuts and broken surfaces show friable, light gray, very fine grained texture, but also a few light-colored clasts up to 6mm, and sparse thin black melt-veins.

Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows approximately 60% pyroxene and 30% plagioclase, accessory silica, ilmenite-chromite intergrowths, troilite, and low-Ni iron metal. Pyroxene is pigeonitic, but some fine exsolution lamellae observed in BSE.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Pigeonite $Fs_{48.3\pm1.8}Wo_{12.8\pm2.0}$, Fe/Mn=33±1, n=20; plagioclase $Or_{0.7\pm0.1}Ab_{11.8\pm1.4}An_{87.6\pm1.5}$, n=3.
Classification: Achondrite, basaltic eucrite.
Specimens: 21.17 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7611 (NWA 7611)
Morocco
Found: May 2012
Classification: Lunar meteorite
History: Reportedly found near the Moroccan/Algerian border in May 2012. Purchased from a Moroccan meteorite dealer in 2012.
Physical characteristics: Single 916 g stone, no fusion crust, smooth exterior with numerous light- and dark-colored clasts, saw cuts reveal brecciated texture with white feldspar and green-brown pyroxene and olivine grains (up to 3 mm) set in a darker gray-green matrix; scattered gabbroic and dark clasts up to 1 cm.
Petrography: (C. Agee, *UNM*; A. Irving, *UWS*) Microprobe examination of a polished 7 × 2 cm sawn slice and a separate polished mount shows a fragmental breccia of plagioclase, pyroxene, and olivine grains in a wide range of grain sizes. A prominent ~1-cm pyroxene-plagioclase gabbroic clast was observed as well as several smaller gabbroic fragments. One small clast consists of intergrown hedenbergite+fayalite+silica (after pyroxferroite). The groundmass is variable with some domains showing a uniform fine-grained subophitic plagioclase-pyroxene texture, while other domains show densely packed mineral clasts ranging from 10-300 μm. There are several sharp boundaries between the various textural domains, with at least two compositionally distinct olivine populations, and a wide range of pyroxene compositions, indicating multiple lithologies of a mingled fragmental breccia. Accessory ilmenite, silica polymorph, minor zircon, troilite, Ti-bearing chromite, Ni-free iron metal and kamacite are present.
Geochemistry: (C. Agee and M. Spilde, *UNM*; A. Irving and S. Kuehner, *UWS*). Fayalitic olivine $Fa_{90.6\pm5.7}$, Fe/Mn=90±4, n=15; forsteritic olivine $Fa_{31.6\pm11.1}$, Fe/Mn=93±9, n=3; pyroxene $Fs_{43.6\pm13.3}Wo_{20.2\pm8.5}$, Fe/Mn=67±8, n=37; pyroxene in gabbroic clast $Fs_{45.3\pm13.1}Wo_{15.4\pm5.3}$, Fe/Mn=69±7, n=12; plagioclase $An_{93.5\pm1.5}Ab_{6.0\pm1.4}Or_{0.5\pm0.5}$, n=13. Bulk composition (R. Korotev, *WUSL*). INAA on 4 subsamples gave the following mean values: Na_2O=0.405, CaO=14.8, FeO=11.27 (wt%); Sc=25.1, Cr=1692, Co=37.6, Ni=181, La=6.38, Nd=8.9, Sm=3.07, Eu=0.891, Lu=0.321, Hf=2.12, Ir=0.0044, Au=0.0036, Th=0.97, U=0.36 (ppm). Oxygen Isotopes, laser fluorination (K.Ziegler, *UNM*), 6 analyses on 3 acid-washed aliquots gave mean values $\delta^{17}O$=3.161±0.080, $\delta^{18}O$=5.931±0.031, $\Delta^{17}O$=0.030±0.075 (linearized, all permil).
Classification: Achondrite (lunar, mingled breccia), high bulk FeO and Sc, and fayalitic olivines suggest the presence of a mare basalt component.
Specimens: A total of 20 g is on deposit at *UNM*. The remainder is divided between Jay Piatek, Matt Morgan, Mike Hankey, and *Haag*; Jay Piatek holds the main mass.

Northwest Africa 7615 (NWA 7615)
Morocco
Purchased: Aug 2012
Classification: Carbonaceous chondrite (CK6)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, weathered fusion crust, saw-cut reveals gray, very fine-grained texture, with a few small indistinct chondrules.

Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows dominant olivine of variable grain size, some up to 1 mm; olivine grain boundaries occupied by plagioclase, aluminous low-Ca pyroxene, and high-Ca pyroxene; ubiquitous Cr-rich magnetite; rare relict chondrules barely discernible in BSE.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine $Fa_{24.7\pm0.4}$, Fe/Mn=87±6, NiO=0.48±0.09 wt%, n=12; aluminous low-Ca pyroxene $Fs_{25.1\pm1.2}Wo_{2.1\pm2.2}$, Fe/Mn=75±4, n=2; high-Ca pyroxene $Fs_{7.8}Wo_{46.2}$, Fe/Mn=41; plagioclase $Or_{4.0\pm1.8}Ab_{67.5\pm6.4}An_{28.4\pm7.9}$, n=4; magnetite with 3.6 wt% Cr_2O_3.
Classification: Carbonaceous chondrite (CK6)
Specimens: 21 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7620 (NWA 7620)
(Northwest Africa)
Purchased: 2011
Classification: Enstatite chondrite (EL6)
History: Purchased by Nicola Castellano at the Torino Mineral Show, Italy.
Physical characteristics: A single piece weighing 147 g with no fusion crust.
Petrography: (V. Moggi Cecchi, G. Pratesi, S. Caporali, *MSP*): The thin section displays rare indistinct chondrules set in a fine-grained matrix, dominated by pyroxene, with minor plagioclase. Several sub-parallel 180 μm-wide veinlets filled with iron oxides/hydroxides also present. Chondrules range from 0.4 to 0.8 mm in diameter and are mainly RP type, with minor GP. Opaque phases are mainly kamacite and troilite, almost completely weathered to iron oxides. Accessory phases are alabandite and daubreelite as blades in troilite. The presence of alabandite, An content of plagioclase and Si content of kamacite point to a classification as EL chondrite.
Geochemistry: Orthopyroxene, $Fs_{1.0}En_{97.7}Wo_{1.3}$; plagioclase, $An_{13.9}Or_{4.2}$; Si in kamacite = 0.8 wt.%; Ti in troilite = 6.1 wt.%.
Classification: Enstatite chondrite (EL6); S2; W3
Specimens: 20.97 g and one thin section are on deposit at *MSP* (*MSP* 5218). Castellano holds the main mass.

Northwest Africa 7622 (NWA 7622)
(Northwest Africa)
Purchased: 2011
Classification: Ordinary chondrite (H3)
History: Purchased by Nicola Castellano at the Torino Mineral Show, Italy.
Physical characteristics: A single piece weighing 61 g with fusion crust.
Petrography: (V. Moggi Cecchi, G. Pratesi, S. Caporali, *MSP*) The meteorite consists of 250-550 μm chondrules of different types (PO, POP, BO, RP) and their fragments embedded in a fine-grained matrix; matrix silicates are mainly olivine and orthopyroxene, with minor clinopyroxene; some olivine grains in BO and PO chondrules are markedly zoned and contain a glassy mesostasis. Opaque phases are kamacite and troilite.
Geochemistry: Olivine, $Fa_{15.2\text{-}21.2}$, mean $Fa_{17.9}$, PMD = 22; Orthopyroxene, $Fs_{14.8\text{-}16.9}En_{83.9\text{-}81.8}Wo_{1.3}$, mean $Fs_{15.8}En_{82.9}Wo_{1.3.}$
Classification: PMD of 22% is consistent with type 3.8.
Specimens: Type specimen, 12.90 g, *MSP*; main mass Castellano.

Northwest Africa 7626 (NWA 7626)
(Northwest Africa)
Purchased: 2011
Classification: Ordinary chondrite (H, melt breccia)
History: Purchased by Nicola Castellano at the Torino Mineral Show, Italy.
Physical characteristics: A single piece weighing 60 g with no fusion crust.

Petrography: (V. Moggi Cecchi, G. Pratesi, S. Caporali, *MSP*): The thin section displays two lithologies: a chondritic one and a impact melted one. The chondritic portion shows an unequilibrated texture consisting of rare chondrules (mainly GO) up to 0.6 mm in diameter, embedded in fine-grained matrix mainly consisting of olivine, plagioclase and orthopyroxene. Opaque phases are metal and troilite. The impact melted portion shows diffuse melt features such as metal veins, micron-sized metal grains and glass.
Geochemistry: Olivine, $Fa_{14.8\text{-}19.2}$, mean $Fa_{16.8}$, PMD 21; orthopyroxene, $Fs_{14.6\text{-}17.1}En_{84.1\text{-}81.6}Wo_{1.3}$, mean $Fs_{14.9}En_{83.8}Wo_{1.3.}$
Classification: PMD consistent with type 3.
Specimens: Type specimen, 12.02 g, *MSP*; main mass Castellano.

Northwest Africa 7627 (NWA 7627)
(Northwest Africa)
Purchased: 2011
Classification: Ordinary chondrite (H, melt breccia)
History: Purchased by Nicola Castellano at the Torino Mineral Show, Italy.
Physical characteristics: A single piece weighing 31 g with no fusion crust.
Petrography: (V. Moggi Cecchi, G. Pratesi, S. Caporali, *MSP*): The thin section displays two lithologies: a chondritic one and a melted one. The chondritic portion shows an equilibrated texture displaying chondrules of various types (GO, POP, PP) up to 0.8 mm in diameter, embedded in fine-grained matrix mainly consisting of olivine, plagioclase and orthopyroxene. Opaque phases are metal and troilite. The melted portion shows diffuse features such as metal veins, μm-sized metal grains and glass.
Geochemistry: Olivine, $Fa_{18.0}$; orthopyroxene, $Fs_{14.4}En_{84.3}Wo_{1.3.}$
Classification: Possible H4-melt breccia.
Specimens: Type specimen, 6.58 g, *MSP*; main mass Castellano.

Northwest Africa 7630 (NWA 7630)
(Northwest Africa)
Purchased: 2012 Oct
Classification: Ureilite
History: Purchased in Temara, Morocco by Adam Aaronson in October 2012 and subsequently acquired by *GHupé*.
Petrography: (A. Irving and S. Kuehner, *UWS*) Protogranular aggregate of predominantly (>90 vol.%) olivine with reduced metal-bearing rims plus minor pigeonite.
Geochemistry: Olivine (cores $Fa_{21.1\text{-}21.3}$; rims $Fa_{12.3}$; Cr_2O_3 = 0.7 wt.%), pigeonite ($Fs_{17.2\text{-}17.8}Wo_{6.1\text{-}6.0}$).
Classification: Ureilite (dunitic). This specimen is unusual in being very olivine-rich with little pyroxene.
Specimens: 22 g of sample and one polished thin section are on deposit at *UWB*. *GHupé* holds the main mass.

Northwest Africa 7632 (NWA 7632)
(Northwest Africa)
Purchased: 2012 Sep
Classification: Carbonaceous chondrite (CO3)
History: Purchased by *Ralew* in September 2012 from a dealer in Midelt, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Small chondrules with tiny (<0.4 mm) CAI and mineral fragments in a fairly sparse matrix.
Geochemistry: Olivine ($Fa_{0.3\text{-}49.6}$; Cr_2O_3 in ferroan examples = 0.03-0.08 wt.%, mean 0.06, s.d. 0.02, N = 6), orthopyroxene ($Fs_{0.8}Wo_{1.0}$; $Fs_{53.7}Wo_{1.9}$), clinopyroxene ($Fs_{2.0}Wo_{43.0}$; $Fs_{5.8}Wo_{38.8}$), diopside ($Fs_{0.2}Wo_{50.3}$).
Classification: Carbonaceous chondrite (CO3).

Northwest Africa 7633 (NWA 7633)

(Northwest Africa)
Purchased: 2012
Classification: Carbonaceous chondrite (CO3)
History: Purchased by *Ralew* in 2012 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh, matrix-rich unequilibrated chondrite composed of separated tiny chondrules and mineral fragments in a black, very fine grained matrix.
Geochemistry: Olivine ($Fa_{0.5\text{-}50.9}$; Cr_2O_3 in ferroan examples = 0.12-0.43 wt.%, mean 0.22, s.d. 0.10, N =9), orthopyroxene ($Fs_{0.9\text{-}1.0}Wo_{1.3\text{-}1.2}$), subcalcic augite ($Fs_{1.3\text{-}5.2}Wo_{33.0\text{-}28.5}$). Oxygen isotopes (K. Ziegler, *UNM*): analyses of acid-washed subsamples by laser fluorination gave, respectively $\delta^{17}O$ = -8.130, -7.044; $\delta^{18}O$ = -5.045, -3.978; $\Delta^{17}O$ = -5.466, -4.944 per mil (for a TFL slope of 0.528). These values plot on an extension of the established trend for CV chondrites towards more oxygen 16-rich compositions, but below the trend for CO chondrites.
Classification: Carbonaceous chondrite (CO3.15). Estimated subtype based on Cr_2O_3 range in ferroan olivine based on Fig. 15 of Grossman and Brearley (2005).

Northwest Africa 7635 (NWA 7635)
(Northwest Africa)
Purchased: 2012 May
Classification: Martian meteorite (Shergottite)
History: Purchased near Dakhla, Morocco in May 2012 by Ali and Mohammed Hmani.
Physical characteristics: A single black, partly fusion crusted stone (195.8 g), containing prominent lath-shaped, glassy maskelynite phenocrysts (some in clusters) in a fine-grained black matrix.
Petrography: (A. Irving and S. Kuehner, *UWS*) Porphyritic texture. Phenocrysts of intermediate plagioclase (as blocky laths, some in groups, completely converted to maskelynite), ferroan olivine, subcalcic augite and Ti-free magnetite are set in a much finer grained, quenched matrix dominated by clinopyroxene (zoned from augite to ferropigeonite) in parallel growth with plagioclase. Accessory pyrrhotite and rare ilmenite are present. No phosphates were found.
Geochemistry: Olivine ($Fa_{60.5\text{-}60.6}$; FeO/MnO = 43-49), subcalcic augite ($Fs_{28.5}Wo_{32.3}$; FeO/MnO = 38; TiO_2 = 0.20 wt.%; Cr_2O_3 = 0.93 wt.%), ferropigeonite $Fs_{60.6\text{-}77.2}Wo_{17.6\text{-}21.8}$; FeO/MnO = 41-48). Bulk composition (G. Chen, *UAb*): Analysis by ICP-MS of powder ground in agate from a 1.1 g interior slice gave (in ppm) Ni 7.7, Rb 0.40, Sr 69.2, Zr 9.8, Ba 9.9, La 0.19, Ce 0.83, Nd 1.38, Sm 0.85, Eu 0.33, Gd 1.65, Yb 1.99, Lu 0.30. Oxygen isotopes (K. Ziegler, *UNM*): three acid washed subsamples analyzed by laser fluorination gave, respectively (all per mil), $\delta^{17}O$ = 2.536, 2.521, 2.513; $\delta^{18}O$ = 4.241, 4.220, 4.217; $\Delta^{17}O$ = 0.297, 0.294, 0.287 (for a TFL slope of 0.528).
Classification: Martian (shergottite, olivine-plagioclase-phyric). This specimen is distinct from other shergottites in containing phenocrysts of very ferroan olivine and maskelynite.
Specimens: 21.2 g of material and 2 polished thin sections are on deposit at *UWB*. The main mass was held by *Hmani* and subsequently was sold to an anonymous collector.

Northwest Africa 7636 (NWA 7636)
(Northwest Africa)
Purchased: 2012 Oct
Classification: Rumuruti chondrite (R4)
History: Purchased in Morocco by A. and M. Hmani from a nomad.
Physical characteristics: Several pale-gray stones with a total weight of 368 g. Portions of the exterior surfaces have dull-black fusion crust, and there are pale orange weathering deposits on most exterior surfaces. The interiors of the stones are fresh.
Petrography: (A. Irving and S. Kuehner, *UWS*) Breccia composed of clasts containing chondrules (mostly PO and BO varieties) and abundant sulfides. Olivine, clinopyroxene, orthopyroxene, intermediate plagioclase, iron sulfide (probably troilite) and Ti-bearing chromite.

Geochemistry: Olivine ($Fa_{39.8-40.4}$; FeO/MnO = 82-84), clinopyroxene ($Fs_{9.9-11.4}Wo_{46.6-43.8}$), orthopyroxene ($Fs_{34.1-35.2}Wo_{1.1-1.3}$; some more magnesian cores $Fs_{13.1}Wo_{1.3}$).
Classification: R4 chondrite.
Specimens: A total of 16.1 g of material and one polished thin section are on deposit at *UWB*. The main mass is held by *Hmani*.

Northwest Africa 7637 (NWA 7637)
(Northwest Africa)
Purchased: 2010
Classification: Enstatite achondrite
History: Purchased by *Hmani* in Morocco in 2010.
Physical characteristics: A single brown 84.9 g stone with fresh, medium gray interior containing abundant metal.
Petrography: (A. Irving & S. Kuehner, *UWS*) Protogranular aggregate dominated by enstatite, with fairly abundant Si-bearing kamacite and Ti-Cr-bearing troilite, plus accessory sodic plagioclase, schreibersite, oldhamite, alabandite, and silica polymorph.
Geochemistry: Enstatite ($Fs_{0.01-0.02}Wo_{1.0-1.3}$).
Classification: Enstatite achondrite.
Specimens: A total of 17 g of type material and one polished thin section are on deposit at *UWB*. The remaining material is held by *Hmani*.

Northwest Africa 7638 (NWA 7638)
(Northwest Africa)
Purchased: 2006 Feb
Classification: Ordinary chondrite (L4)
History: Purchased by Philip Mani in February 2006 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving & S. Kuehner, *UWS*) Very fresh specimen composed of well-formed chondrules in a matrix containing sporadic primary voids (inside which chondrule outlines are visible). Minerals are olivine, orthopyroxene, pigeonite, chlorapatite, fresh kamacite and troilite. No plagioclase was found, but there is abundant alkali-rich glass.
Geochemistry: Olivine ($Fa_{23.0-24.2}$), orthopyroxene ($Fs_{19.3-19.4}Wo_{1.5}$; some cores $Fs_{9.5}Wo_{0.7}$), subcalcic augite ($Fs_{11.7-12.8}Wo_{34.9-33.1}$).
Classification: Ordinary chondrite (L4).
Specimens: Type sample and polished thin section at *UWB*. Main mass with P. Mani.

Northwest Africa 7640 (NWA 7640)
(Northwest Africa)
Purchased: 2012 Nov
Classification: Primitive achondrite (Brachinite)
History: Found purportedly near Zwirat, Mauritania, and purchased by Mohamed Aid in Ouarzazate, Morocc,o in November 2012.
Physical characteristics: A single weathered stone of 1106 g.
Petrography: (A. Irving and S. Kuehner, *UWS*) Protogranular aggregate of predominantly olivine with lesser clinopyroxene and intermediate plagioclase, plus accessory chromite, altered kamacite and Fe-sulfide (some Ni-bearing). Fine grained intergrowths of iron metal + orthopyroxene occur along olivine grain boundaries. Secondary iron hydroxides are present along grain boundaries.
Geochemistry: Olivine ($Fa_{31.9-32.2}$, FeO/MnO = 65), augite ($Fs_{9.3-9.7}Wo_{47.9-47.6}$, FeO/MnO = 36-60).
Classification: Achondrite (brachinite).
Specimens: 20.1 g of material and one polished thin section are at *UWB*. The remaining material is held by Mr. M. Aid.

Northwest Africa 7641 (NWA 7641)
(Northwest Africa)
Purchased: 2012 Oct
Classification: Mesosiderite
History: Purchased by Gary Fujihara in October 2012 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) The specimen contains large grains of metal (kamacite with taenite) and interstitial regions rich in orthopyroxene accompanied by accessory olivine (of variable composition), calcic plagioclase, silica, merrillite, chromite and sparse troilite.
Geochemistry: Orthopyroxene ($Fs_{29.1\text{-}31.8}Wo_{2.8\text{-}2.9}$; FeO/MnO = 20-27), olivine ($Fa_{27.6}$, FeO/MnO = 30; $Fa_{37.3}$, FeO/MnO = 40).
Specimens: 22 g of material is on deposit at *UWB*. The remaining material is held by Mr. G. Fujihara.

Northwest Africa 7646 (NWA 7646)
(Northwest Africa)
Purchased: 2012 Dec
Classification: Ordinary chondrite (L3)
History: Purchased by Darryl Pitt in December 2012 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Closely packed chondrules (0.2 to 2 mm) dominated by PO and PP. Minerals include olivine, orthopyroxene, subcalcic augite, augite, sodic plagioclase, chromite, troilite and altered kamacite.
Geochemistry: Olivine $Fa_{3.9\text{-}44.1}$, n=10; Cr_2O_3 in ferroan olivine 0.03-0.11 wt.%, mean 0.07 wt.%, sd 0.03 wt.%, N = 7. Orthopyroxene $Fs_{1.8\text{-}19.7}Wo_{0.9\text{-}1.9}$; subcalcic augite $Fs_{9.4}Wo_{32.4}$; augite $Fs_{11.6}Wo_{41.0.}$
Classification: Estimated L3.5. Chondrule size and range consistent with L. Subtype estimated to be 3.5 based on Cr_2O_3 range in ferroan olivine. Estimation of subtype based on histograms (Fig. 4) in Grossman and Brearley (2005).
Specimens: 24.6 g and one polished thin section at *UWB*. *DPitt* holds the main mass.

Northwest Africa 7651 (NWA 7651)
Morocco
Purchased: 2012
Classification: HED achondrite (Eucrite, cumulate)
History: Acquired by Adam Bates and Aziz Habibi in Morocco, 2012.
Physical characteristics: Three matching stones, the largest 1100 g, with shiny black fusion crust. Saw cut reveals a mosaic of mm-size, white plagioclase and green-brown pyroxene crystals.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows texturally equilibrated gabbro with approximately equal percentages of plagioclase and pyroxene; pyroxene has exsolution lamellae, many triple-junction grain boundaries, also some pyroxene and plagioclase poikiloblasts. Ubiquitous silica, chromite, and ilmenite.
Geochemistry: (C. Agee and M. Spilde, *UNM*) EMPA. Pyroxene $Fs_{45.2\pm13.2}Wo_{20.2\pm16.5}$, Fe/Mn=32±1, n=20; plagioclase $Or_{0.6\pm0.1}Ab_{10.2\pm0.6}An_{89.1\pm0.6}$, n=4.
Classification: (Eucrite-cm). Gabbro, highly equilibrated both texturally and compositionally, similar in texture to Moore County, however significantly higher pyroxene Fs-content than typical eucrite-cm, hence anomalous.
Specimens: 21 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7652 (NWA 7652)
Morocco
Purchased: Aug 2012
Classification: Ordinary chondrite (L3.6)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.

Physical characteristics: Single stone with dark weathered exterior. Saw-cut reveals many densely packed chondrules of variable size, moderately iron stained.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous unequilibrated chondrules, range ~100-2000 μm, ubiquitous troilite, most metal weathered to Fe-oxide.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine $Fa_{23.4\pm8.3}$, Fe/Mn=56±15, Cr_2O_3=0.07±0.08 wt%, n=31; low-Ca pyroxene $Fs_{9.8\pm7.6}Wo_{1.2\pm1.2}$, Fe/Mn=32±33, n=29.
Classification: Ordinary chondrite (L3.6), mean Fa-content and sigma consistent with type 3.6, low-Ca pyroxene has anomalously low mean Fs-content and high sigma for type 3.6, weathering grade W3.
Specimens: 22 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7653 (NWA 7653)
Morocco
Purchased: Aug 2012
Classification: Ordinary chondrite (L5)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, dark brown weathered exterior, saw-cut reveals ordinary chondrite breccia blocks, up to 2 cm, bounded by dark melt veins and pockets, fine-grained metal/sulfides.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a texturally equilibrated chondrite, but also fine-grained recrystallization of chondrules from shock, ubiquitous troilite, taenite, kamacite, and plagioclase.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine $Fa_{23.6\pm0.6}$, Fe/Mn=48±3, n=15; low-Ca pyroxene $Fs_{21.2\pm0.8}Wo_{1.7\pm0.3}$, Fe/Mn=30±2, n=11; high-Ca pyroxene $Fs_{8.3\pm0.5}Wo_{44.3\pm0.4}$, Fe/Mn=23±3, n=4.
Classification: Ordinary chondrite (L5), breccia, weathering grade W1.
Specimens: 21 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7654 (NWA 7654)
Morocco
Purchased: Aug 2012
Classification: Ordinary chondrite (L5)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, dark weathered fusion crust, saw-cut reveals many densely packed chondrules of variable size, fine-grained metal/sulfides, but some up to 1mm.
Petrography: C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous chondrules, ubiquitous taenite, troilite, mesostasis, and fine-grained plagioclase.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine $Fa_{22.8\pm0.6}$, Fe/Mn=46±3, n=30; low-Ca pyroxene $Fs_{20.5\pm1.3}Wo_{1.6\pm2.2}$, Fe/Mn=31±3, n=30.
Classification: Ordinary chondrite (L5) weathering grade W1.
Specimens: 22 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7655 (NWA 7655)
Morocco
Purchased: Aug 2012
Classification: Carbonaceous chondrite (CR2)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone with dark weathered irregular surface with chondrules visible through desert patina. Saw cut reveals many chondrules of variable size, some armored with metal/sulfide, scattered metal spherules, set in a dark reddish brown matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous porphyritic chondrules some up to 3 mm, in a fine-grained, sulfide- and metal-rich, matrix. Many

chondrules contain igneous kamacite spheres, and some of the larger chondrules are rimmed with metal/sulfide. Spherical, metal-rimmed, 3 mm CAI with spinel, anorthite, and forsterite present.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Ferroan olivine $Fa_{6.8\pm8.3}$, range $Fa_{2.1\text{-}25.4}$, Fe/Mn=25±16, Cr_2O_3=0.60±0.11, CaO=0.19±0.05 wt%, n=13; Type I chondrule olivine $Fa_{1.3\pm0.3}$, Cr_2O_3=0.38±0.11, CaO=0.37±0.14 wt%, n=15; low-Ca pyroxene $Fs_{2.6\pm1.2}Wo_{0.9\pm0.9}$, Fe/Mn=15±5, n=25; fassaite $Fs_{2.1\pm1.6}Wo_{43.1\pm4.8}$, Al_2O_3=7.48±1.10 wt%.
Classification: Carbonaceous chondrite (CR2)
Specimens: 23 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7656 (NWA 7656)
Morocco
Purchased: Aug 2012
Classification: Ordinary chondrite (L3.3)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone with dark weathered surface and chondrules visible through desert patina. Saw cut reveals slight brecciation and directional fabric, many densely packed chondrules of variable size in a dark matrix, abundant fine-grained metal/sulfides.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous unequilibrated chondrules, many 200-500 μm, range ~100-2000 μm, ubiquitous kamacite, taenite, and troilite; minor high-Ca pyroxene.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine $Fa_{15.5\pm9.5}$, range $Fa_{2.1\text{-}37.6}$, Fe/Mn=48±20, Cr_2O_3=0.08±0.05 wt%, CaO=0.09±0.06 wt%, n=28; low-Ca pyroxene $Fs_{4.2\pm2.9}Wo_{0.8\pm1.3}$, range $Fs_{0.6\text{-}13.4}$, Fe/Mn=17±15, n=26.
Classification: Ordinary chondrite (L3.3), weathering grade W2.
Specimens: 21.4 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7657 (NWA 7657)
Morocco
Purchased: Nov 2012
Classification: Mesosiderite
History: Purchased by Adam Bates from a Moroccan meteorite dealer, November 2012.
Physical characteristics: Two stones, irregular dark brown exterior with some metal and silicate visible in desert patina. Saw cut reveals ~50% bright metal patches in a light brown-gray silicate matrix, also a ~20 mm dark silicate clast containing fine-grained metal.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows approximately 50% silicates and 50% metal. Silicates dominated by pyroxene, but also ~25% anorthitic plagioclase, accessory silica, olivine, chromite, phosphate and troilite. Pyroxene shows lamellar exsolution, some plagioclase grains show euhedral forms, large pyroxene clast is riddled with fine metal veins and blebs. Metal is approximately 90% kamacite and 10% taenite, minor amounts of schreibersite detected.
Geochemistry: (C. Agee and M. Spilde, *UNM*) EMPA. Low Ca-pyroxene $Fs_{27.9\pm3.1}Wo_{3.2\pm0.6}$, Fe/Mn=27±2, n=17; high Ca-pyroxene $Fs_{15.8\pm0.8}Wo_{40.8\pm0.3}$, Fe/Mn=19±1, n=4; olivine $Fa_{25.3\pm2.7}$, Fe/Mn=38±4, n=8, plagioclase $Or_{0.3\pm0.0}Ab_{8.6\pm0.6}An_{91.1\pm0.6}$, n=6; kamacite Fe=93.03±0.46, Ni=6.49±0.25, Co=0.45±0.02 wt%, n=16; taenite Fe=60.89±1.83, Ni=38.60±1.75, Co=0.09±0.03 wt%, n=6.
Classification: Mesosiderite
Specimens: 48.1 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7658 (NWA 7658)
Morocco
Purchased: Aug 2012
Classification: Ordinary chondrite (L3.5)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.

Physical characteristics: Single stone with dark weathered exterior. Saw cut reveals many densely packed chondrules of variable size, moderately iron stained.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous unequilibrated PO, POP, BO chondrules, range ~200-2000 μm, ubiquitous troilite, most metal weathered to Fe-oxide.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{22.1\pm8.7}$, Fe/Mn=54±16, Cr_2O_3=0.10±0.14 wt%, n=28; low-Ca pyroxene $Fs_{9.6\pm7.4}Wo_{0.9\pm0.8}$, Fe/Mn=25±21, n=34.
Classification: Ordinary chondrite (L3.5), mean Fa-content and sigma consistent with type 3.5, low-Ca pyroxene has anomalously low mean Fs-content and high sigma for type 3.5, weathering grade W3.
Specimens: 21 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7659 (NWA 7659)
Morocco
Purchased: 2011
Classification: Ordinary chondrite (H4)
History: Purchased by David Robinson from Sean Tutorow in December 2011.
Physical characteristics: Single stone, weathered rough exterior, saw cut reveals many small chondrules and metal set in a dark gray groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows many distinct BO, PO, and POP chondrules, some with mesostasis. Troilite and taenite present, ~50% of metal is oxidized, numerous weathering veins.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine $Fa_{21.2\pm0.5}$, Fe/Mn=42±2, n=10; low-Ca pyroxene $Fs_{12.5\pm4.5}Wo_{0.6\pm0.3}$, Fe/Mn=22±5, n=10.
Classification: Ordinary chondrite (H4), weathering grade W3.
Specimens: 21.9 g including a probe mount on deposit at *UNM*, Sean Tutorow holds 50 g, David Robinson holds the main mass.

Northwest Africa 7667 (NWA 7667)
(Northwest Africa)
Purchased: 2012 Dec
Classification: Ordinary chondrite (L4)
History: Purchased in Temara, Morocco by Adam Aaronson in December 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-developed, closely-packed, medium-sized chondrules.
Geochemistry: Olivine ($Fa_{23.0\text{-}23.8}$), orthopyroxene ($Fs_{20.1\text{-}20.2}Wo_{0.4}$; some cores $Fs_{12.4}Wo_{0.3}$), pigeonite ($Fs_{15.9}Wo_{18.1}$), augite ($Fs_{7.7}Wo_{45.0}$).
Classification: Ordinary chondrite (L4).
Specimens: Type sample and polished thin section at *UWB*. Main mass with *Aaronson*.

Northwest Africa 7671 (NWA 7671)
(Northwest Africa)
Purchased: 2012 Dec
Classification: Mesosiderite
History: Purchased in Temara, Morocco by Adam *Aaronson* in December 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) The specimen contains large grains of metal (kamacite with taenite) with interstitial orthopyroxene, olivine, calcic plagioclase and chromite.
Geochemistry: Orthopyroxene ($Fs_{26.6\text{-}28.3}Wo_{2.5\text{-}4.2}$; FeO/MnO = 24-25), olivine ($Fa_{29.4\text{-}29.9}$; FeO/MnO = 49-53).
Classification: Mesosiderite.
Specimens: 14.6 g of material is on deposit at *UWB*. The remaining material is held by Mr. A. *Aaronson*.

Northwest Africa 7674 (NWA 7674)
(Northwest Africa)
Purchased: 2012 Dec
Classification: Primitive achondrite (Lodranite)
History: Purchased in Temara, Morocco by Adam Aaronson in December 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Protogranular texture with grainsize from 0.3-0.8 mm. Constituent minerals are olivine, orthopyroxene, clinopyroxene, chromite, altered kamacite, taenite, and troilite.
Geochemistry: Olivine ($Fa_{10.2-12.4}$; FeO/MnO = 19-21), orthopyroxene ($Fs_{10.9-11.0}Wo_{4.0-3.8}$; FeO/MnO = 13), clinopyroxene ($Fs_{5.7-5.8}Wo_{40.1-40.2}$; FeO/MnO = 9-10). Oxygen isotopes (D. Rumble, *CIW*): analyses of acid-washed silicate material by laser fluorination gave, respectively: $\delta^{17}O$ = 1.004, 0.764; $\delta^{18}O$ = 3.488, 3.281; $\Delta^{17}O$ = -0.831, -0.962 (all per mil).
Classification: Lodranite.
Specimens: 21.4 g of material and one polished thin section at *UWB*. The remaining material is held by *Aaronson*.

Northwest Africa 7677 (NWA 7677)
(Northwest Africa)
Purchased: 2012 Aug
Classification: HED achondrite (Diogenite)
History: Purchased by Eric Twelker in August 2012 from a dealer in Agadir, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh specimen with cataclastic or mortar texture. Composed predominantly of orthopyroxene ($Fs_{24.8-25.3}Wo_{4.8-4.3}$, FeO/MnO = 27-29) with accessory clinopyroxene ($Fs_{11.2-11.3}Wo_{44.0-43.6}$, FeO/MnO = 19-20), anorthite, chromite, troilite and slightly stained Ni-free metal.
Geochemistry: Orthopyroxene ($Fs_{24.8-25.3}Wo_{4.8-4.3}$, FeO/MnO = 27-29), clinopyroxene ($Fs_{11.2-11.3}Wo_{44.0-43.6}$, FeO/MnO = 19-20).
Classification: Diogenite. Although no olivine was found in the studied thin section, this specimen is likely paired with NWA 7464, NWA 7599 and other stones from the same find site.
Specimens: A total of 23.3 g of sample and one polished thin section are on deposit at *UWB*. The remaining material is held by *Twelker*.

Northwest Africa 7678 (NWA 7678)
Morocco
Purchased: 2012 Aug
Classification: Carbonaceous chondrite (CV3)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: 182 matching individuals/fragments, main mass 581 g. Dark weathered exterior, saw-cut reveals many small chondrules less than 1 mm and a few up to 5 mm, scattered CAIs up to 1 cm, set in a dark gray groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a numerous AOA, BO, PO, POP, and PP chondrules, most in the size range 300-1000 µm, in very fine-grained matrix. Abundant troilite; nearly all iron metal is oxidized by weathering.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Chondrule olivine range: $Fa_{0.7-63.1}$, n=31. Type I chondrules: olivine $Fa_{3.0\pm1.9}$, Fe/Mn=49±31, Cr_2O_3=0.14±0.09, n=26; low-Ca pyroxene $Fs_{2.0\pm1.6}Wo_{1.3\pm0.9}$, Fe/Mn=25±20, n=23. Type II chondrules: olivine $Fa_{40.3\pm26.4}$, Fe/Mn=133±53, Cr_2O_3=0.08±0.04, n=5. Fassaite $Fs_{5.1\pm0.6}Wo_{58.4\pm1.2}$, Al_2O_3=23.69±0.14 wt%, Na_2O=2.65±0.00 wt%, n=2.
Classification: Carbonaceous chondrite (CV3)
Specimens: 65 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7679 (NWA 7679)

Morocco
Purchased: 2012
Classification: Ordinary chondrite (L6)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, dark brown weathered exterior, saw-cut reveals faint chondrules set in a reddish brown matrix, fine-grained metal/sulfide.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows chondrules set in a texturally equilibrated matrix of olivine, pyroxene, and plagioclase; accessory troilite and oxidized iron metal.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{24.7\pm0.3}$, Fe/Mn=51±1, n=6; low-Ca pyroxene $Fs_{21.5\pm1.1}Wo_{1.5\pm0.3}$, Fe/Mn=31±2, n=6.
Classification: Ordinary chondrite (L6) weathering grade W3.
Specimens: 24 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7680 (NWA 7680)
(Northwest Africa)
Purchased: Jan 2011
Classification: Ungrouped achondrite
History: Purchased by David Gregory in Tucson, January 2011.
Physical characteristics: Cutting revealed two distinct regions. One composed of metal and the other largely of silicate grains.
Petrography: Consists of large Fe-Ni-metal pieces with the largest piece being ~1 cm across in the sectioned sample. The remainder of the sample is predominantly olivine (roughly mm scale) with interstitial plagioclase. Chromite is found as stand-alone grains and as inclusions in olivine and plagioclase. Melt inclusions are also found in the olivine and consist of glass, pyroxene and phosphate. Metal and sulfide grains are also present.
Geochemistry: Olivine ($Fa_{44.8}$; FeO/MnO=73.6), plagioclase ($An_{41.5}$;$Or_{1.8}$,N=31), small clinopyroxene grains surrounded by glass have an approximate composition of $Fs_{14}Wo_{47.}$ The glass has nearly albite composition. Chromite has a range in Ti content. Isolated grains tend to have lower concentrations (TiO_2=2.17%, N=11) and inclusions have Ti content (TiO_2=4.45%, N=7). Metal generally has a Ni content of 6.34% (N=38), however, regions high in Ni are present and can have Ni content up to nearly 50%. Oxygen isotopes (N. Banerjee, I. Jabeen, and A. Ali, *WUC*): laser fluorination of olivine grain separates (minor plagioclase) and acid-washed bulk powders gave average values of $\delta^{17}O = 2.65$; $\delta^{18}O = 7.04$; $\Delta^{17}O = -1.03$ per mil (N=8).
Classification: Ungrouped achondrite. O isotopes plot on a single trend line near the lodranite-acapulcoite trend line, although the $\delta^{18}O$ values are higher than typically seen in this group (see Greenwood et al., 2012). The values are also in the range of ureilites and this connection must be considered. Olivine and plagioclase compositions are more similar to brachinite and brachinite-like meteorites. However, the olivine is more Fe-rich. This meteorite may be related to another ungrouped achondrite, NWA 6962.
Specimens: The specimen currently includes 3 pieces. The type material/largest mass, 1 polished thick section and 1 end cut.

Northwest Africa 7681 (NWA 7681)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (LL5)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, light-brown weathered exterior, saw-cut reveals scattered chondrules set in a light- brown matrix, sparse fine-grained metal/sulfide.

Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows chondrules of variable size, accessory troilite, plagioclase, and scattered oxidized iron metal.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine $Fa_{27.4\pm0.4}$, Fe/Mn=59±3, n=31; low-Ca pyroxene $Fs_{21.8\pm2.9}Wo_{1.3\pm0.6}$, Fe/Mn=33±3, n=28.
Classification: Ordinary chondrite (LL5) weathering grade W3.
Specimens: 25 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7682 (NWA 7682)
Morocco
Purchased: 2012
Classification: HED achondrite (Eucrite)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August, 2012.
Physical characteristics: Single stone, some smooth fusion crust. Saw cut and broken surfaces show friable, light gray, fine grained texture.
Petrography: Microprobe examination of a polished mount shows approximately 60% pyroxene and 30% plagioclase, plus accessory silica, ilmenite, troilite, and low-Ni iron metal.
Geochemistry: (C. Agee, M. Spilde, L. Burkemper, *UNM*) Pyroxene $Fs_{50.4\pm1.9}Wo_{11.6\pm2.0}$, Fe/Mn=33±1, n=24; plagioclase $An_{89.8\pm0.6}$, n=3.
Classification: Achondrite (Eucrite), basaltic eucrite. Possibly paired with NWA 7609.
Specimens: 14.6 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7683 (NWA 7683)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (L3.6)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, dark brown weathered exterior, saw-cut reveals many densely packed chondrules of variable size, one up to 7 mm, fine-grained metal/sulfide.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous unequilibrated chondrules, most in the range ~200-1500 μm, ubiquitous troilite, kamacite, taenite, and Fe-oxide.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{23.1\pm6.7}$, Fe/Mn=59±18, Cr_2O_3=0.05±0.04 wt%, n=34; low-Ca pyroxene $Fs_{15.1\pm8.8}Wo_{1.8\pm2.6}$, Fe/Mn=38±35, n=32.
Classification: Ordinary chondrite (L3.6), mean Fa-content and sigma consistent with type 3.6, low-Ca pyroxene has anomalously high sigma for type 3.6, weathering grade W2.
Specimens: 25 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7684 (NWA 7684)
Morocco
Found: 2011
Classification: Ordinary chondrite (H4)
History: One mostly crusted stone with a mass of 314 g; it was found and purchased in Morocco in 2011. The sample was acquired from a prospector in 2011 by Thomas Webb.
Physical characteristics: Weathered fusion crust covers the entirety of the stone except for a fractured area on one side of the weakly rectangular stone and regmaglypts cover a portion of the stone.
Petrography: (Anthony Frushour, *App*): The sample has a chondritic texture with well-defined chondrules in a slightly recrystallized matrix. Chondrules and fragments are well packed. The sample contains RP, PP, poikolitic OP, POP, PO, BO and GO chondrules that have an average diameter of 1.34 mm. Porphyritic chondrules display weakly devitrified matrix to fully recrystallized mesostasis with plagioclase visible. Clinoenstatite is common in pyroxene chondrules. Fe-Ni metal and troilite occur both

as individual grains and intergrown masses of metal, mineral grains also occur mixed with some of the Fe-Ni metal and troilite.
Geochemistry: (A. Frushour, *App*): Olivine, $Fa_{17.9\pm0.2}$ (PMD=0.9, N=17); low-Ca pyroxene, $Fs_{15.2\pm0.4}$ (PMD=2.1, N=14), $Wo_{0.9\pm0.1}$ (PMD=12.9, N=14).
Specimens: 20 g and 1 thin section on deposit at *App*

Northwest Africa 7685 (NWA 7685)
Northwest Africa
Purchased: 2005
Classification: Ordinary chondrite (H6)
History: One desert-ablated stone weighing 73.9 g was found and purchased in Morocco in 2005. Thomas Webb purchased this stone within a group of unclassified stones from a Moroccan dealer in 2005.
Physical characteristics: The stone is reddish-brown and devoid of fusion crust and shows slight orientation.
Petrography: (Anthony Love, *App*): Sample displays barely discernible chondrules set in recrystallized matrix crosscut by two sets of shock veins.
Geochemistry: (A. Love, *App*): Olivine, $Fa_{20.5\pm0.3}$ (N=12); pyroxene, $Fs_{18.9\pm0.7}Wo_{1.6\pm0.3}$ (N=13).
Classification: H6 S3 W2
Specimens: 65.79 g and 1 thin section are on deposit at *App*.

Northwest Africa 7686 (NWA 7686)
Morocco
Purchased: 2012 Aug
Classification: Ureilite
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, weathered, irregular, dark exterior, saw cut reveals dark gray mosaic of olivine and pyroxene crystals, with scattered, fine-grained metal/oxide.
Petrography: (C. Agee, *UNM*) SEM examination of a polished mount shows approximately 60% olivine, 40% pigeonite, texturally equilibrated with triple junctions, grain size 300-800 μm. Most olivines zoned with forsteritic rims, grain boundaries occupied with metal that has been oxidized.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{8.3\pm2.2}$, Fe/Mn=16±5, Cr_2O_3=0.75±0.27 wt%, CaO=0.38±0.06 wt%, n=8; pigeonite $Fs_{8.4\pm0.5}Wo_{7.2\pm0.2}$, Fe/Mn=15±3, n=6.
Classification: Ureilite, based on presence of pigeonite, and Cr_2O_3 and CaO content in olivine, and Fe-Mg zonation of olivine.
Specimens: 25 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7698 (NWA 7698)
(Northwest Africa)
Purchased: 2012
Classification: Ureilite
Petrography: The meteorite consists of blocky, ~2-mm sized olivine, orthopyroxene, and pigeonite grains. Olivine displays characteristic reduced Fe-poor rims. No diamonds were found.
Geochemistry: olivine: $Fa_{22.6}$, reduced rims 2.5-6.3; opx: $Fs_{15.2\text{-}17.7}Wo_{1.7\text{-}4.6}$; pigeonite: $Fs_{13\text{-}19.5}Wo_{6\text{-}9.8}$

Northwest Africa 7702 (NWA 7702)
(Northwest Africa)
Found: 2011
Classification: HED achondrite (Eucrite, polymict)
Petrography: The meteorite is partly covered with fusion crust and displays a grayish to sandy interior. It consists of differently textured basaltic and rare melt clast set into a fine-grained clastic matrix of

dominantly calcic plagioclase and exsolved pyroxene. Minor phases include SiO_2 polymorphs, chromite, and troilite. Few thin shock veins are present.
Geochemistry: Opx: $Fs_{58.9\text{-}60.9}Wo_{1.6\text{-}2.4}$, FeO/MnO=31-35; cpx: $Fs_{25.1\text{-}29}Wo_{40.5\text{-}44.8}$, FeO/MnO=27-35; calcic plagioclase: $An_{86.2}$ (range $An_{82.5\text{-}89.5}$).

Northwest Africa 7705 (NWA 7705)
(Northwest Africa)
Found: 2012
Classification: HED achondrite (Eucrite, polymict)
Petrography: Fresh, partly fusion crust covered meteorite displaying a dark-grayish interior with easily discernable lithic clasts. Lithic clasts include basaltic and melt lithologies; mineral fragments are dominantly large exsolved pyroxenes and clacic plagioclase. SiO_2, chromite, troilte and rare FeNi metal are minor constituents.
Geochemistry: Opx: $Fs_{55.8\text{-}58}$Ws1.6-3.5, FeO/MnO=31-35; cpx: $Fs_{23.3\text{-}26.1}Wo_{44\text{-}44.6}$, FeO/MnO=29-35; calcic plagioclase: $An_{86.8}$ (range $An_{80.7\text{-}90}$).

Northwest Africa 7706 (NWA 7706)
(Northwest Africa)
Found: 2012
Classification: HED achondrite (Eucrite, polymict)
Petrography: The meteorite is partly covered with a shiny fusion crust and displays a light-colored interior dominated by large basaltic clast set into a fine-grained clastic matrix; few melt clasts are present. Calcic plagioclase is very abundant, pyroxene grains are typically exsolved. Accessory minerals include chromite, troilite, and SiO_2.
Geochemistry: Opx: $Fs_{61.9\text{-}66.2}Wo_{1.6\text{-}2.7}$, FeO/MnO=30-32; cpx: $Fs_{27.6\text{-}30.6}Wo_{41.8\text{-}43.1}$, FeO/MnO=29-34; calcic plagioclase: $An_{87.8}$ (range $An_{85.8\text{-}89.7}$).

Northwest Africa 7708 (NWA 7708)
(Northwest Africa)
Found: 2012
Classification: Mesosiderite
Petrography: The overall brownish appearing rock consists of almost equal parts of Fe,Ni metal (kamacite and rare taenite) and silicates. Silicates are orthopyroxene, augite, and calcic plagioclase; no olivine.
Geochemistry: Opx: $Fs_{29.1}Wo_{1.9}$, FeO/MnO=26-31; cpx: $Fs_{12.9}$Ws42.3, FeO/MnO=20-23; calcic plagioclase: $An_{90.2}$ (range $An_{88.2\text{-}92.7}$).

Northwest Africa 7709 (NWA 7709)
(Northwest Africa)
Found: 2012
Classification: Rumuruti chondrite (R3)
Petrography: The light brownish rock is composed of clearly 0.3-0.4 mm sized and clearly defined chondrules set into a more fine-grained matrix of chondrule and mineral fragments. The meteorite contains some dark clast. In both lithologies olivine and pyroxene are unequilibrated. Opaque phases are dominantly sulfides; metal is rare.

Northwest Africa 7714 (NWA 7714)
(Northwest Africa)
Purchased: 2012
Classification: HED achondrite (Howardite)

Petrography: The fresh greyish breccia is composed of diogenetic clasts dominating over basaltic eucrite clasts set in a fine-grained clastic matrix. Diogenitic fragments are composed of large blocky orthopyroxene and Ca-rich plagioclase crystals, eucrite clasts dominated by exsolved Ca-pyroxenes and often lath-shaped calcic plagioclase. Accessories in both lithologies include silica, chromite, and troilite.
Geochemistry: Diogenitic orthopyroxene $Fs_{25.8\text{-}30.5}Wo_{2.1\text{-}3.6}$, FeO/MnO=26-38; low-Ca pyroxene $Fs_{32.2\text{-}49.1}Wo_{2.1\text{-}6}$, FeO/MnO=23-36; high-Ca pyroxene $Fs_{60.5\text{-}63.9}Wo_{24.8\text{-}34.5}$, FeO/MnO=38-56; calcic plagioclase $An_{91.2}$, range $An_{84.1\text{-}93.9}$.

Northwest Africa 7715 (NWA 7715)
(Northwest Africa)
Purchased: 2012 Jun
Classification: Ordinary chondrite (H6)
History: Purchased by *JUtas* in June 2012 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Extensively recrystallized with very sparse, small remnant chondrules. Olivine, orthopyroxene, augite, sodic plagioclase, chromite, merrillite, altered kamacite and troilite. The specimen is crosscut by subparallel, thin secondary iron hydroxide veinlets.
Geochemistry: Olivine ($Fa_{19.0\text{-}19.3}$), orthopyroxene ($Fs_{16.9\text{-}17.2}Wo_{1.8\text{-}1.5}$), augite ($Fs_{6.6\text{-}7.7}Wo_{46.0\text{-}46.1}$).
Classification: Ordinary chondrite (H6). Likely paired with NWA 7832.
Specimens: A total of 27.1 g of material and one polished thin section are on deposit at *UWB*. The main mass is held by J. and P. Utas.

Northwest Africa 7716 (NWA 7716)
(Northwest Africa)
Purchased: 2012 Jan
Classification: Pallasite
History: Purchased by John Higgins in January 2012 from a dealer in Ouarzazate, Morocco.
Physical characteristics: A group of 40 small weathered stones.
Petrography: (A. Irving and S. Kuehner, *UWS*) This extensively weathered specimen now consists of fragments of fresh olivine (with rare troilite inclusions) cross-cut by veinlets of iron hydroxides containing some remnant kamacite and taenite.
Geochemistry: Olivine ($Fa_{13.7\pm0.1}$, n = 3; FeO/MnO = 39-42).
Classification: Pallasite.
Specimens: 40 g of material and one polished thin section are at *UWB*. The remaining material is held by Mr. J. Higgins.

Northwest Africa 7717 (NWA 7717)
(Northwest Africa)
Purchased: 2012 Aug
Classification: Ordinary chondrite (H4)
History: Purchased in Temara, Morocco by Adam Aaronson in August 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-developed small chondrules and relatively abundant altered metal..
Geochemistry: Olivine ($Fa_{18.9\text{-}19.3}$), orthopyroxene ($Fs_{16.3}Wo_{1.1}$; some cores $Fs_{3.3}Wo_{0.4}$), augite ($Fs_{5.7\text{-}6.9}Wo_{49.4\text{-}47.4}$).
Classification: Ordinary chondrite (H4).
Specimens: Type sample and polished thin section at *UWB*. Main mass with *Aaronson*.

Northwest Africa 7721 (NWA 7721)
(Northwest Africa)
Purchased: 2012 Dec
Classification: Martian meteorite (Shergottite)

History: Purchased in Temara, Morocco in 2012 December by Adam Aaronson.
Physical characteristics: A single stone (32 g) composed of brown, pale green and vesicular white grains.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively coarse grained with both poikilitic and equigranular domains; some oikocrysts are up to 4 mm across. Composed of olivine, orthopyroxene, clinopyroxene (pigeonite and subcalcic augite), intermediate plagioclase (vesicular), Ti-rich chromite, ilmenite (with baddeleyite inclusions), pyrrhotite and rare merrillite. Melt inclusions in olivine (composed of glass+Al-bearing clinopyroxene+minor merrillite) are surrounded by radial expansion cracks.
Geochemistry: Olivine ($Fa_{29.1\text{-}33.6}$; FeO/MnO = 45-53), orthopyroxene ($Fs_{21.2\text{-}21.6}Wo_{3.1}$; FeO/MnO = 31), pigeonite ($Fs_{22.3\text{-}28.8}Wo_{6.9\text{-}8.2}$; FeO/MnO = 27-31).
Classification: Martian (shergottite, poikilitic). On the basis of texture, mineral compositions and find location, this specimen appears to be paired with the two stones classified as NWA 1950.
Specimens: 6.6 g of material is on deposit at *UWB*. *Aaronson* holds the main mass.

Northwest Africa 7723 (NWA 7723)
(Northwest Africa)
Purchased: 2012-Dec
Classification: Enstatite chondrite (EL6)
History: Purchased in Temara, Morocco by *Aaronson* in December 2012.
Physical characteristics: A single brown stone (300 g) with little metal visible in the interior.
Petrography: (A. Irving and S. Kuehner, *UWS*) No chondrules observed. Composed predominantly of enstatite with accessory Si-poor kamacite, daubreelite, pyrrhotite, and pentlandite.
Geochemistry: Enstatite $Fs_{0.2\text{-}0.3}Wo_{1.3\text{-}1.4}$, n=3.
Classification: EL6 chondrite.
Specimens: A total of 20 g of type material and one polished thin section are on deposit at *UWB*. The remaining material is held by *Aaronson*.

Northwest Africa 7728 (NWA 7728)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Rumuruti chondrite (R4)
History: Purchased by Gary Fujihara in February 2013 from a dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh breccia consisting of clasts with well-formed, separated chondrules and abundant sulfides.
Geochemistry: Olivine ($Fa_{41.0\text{-}42.4}$; FeO/MnO = 76-86), clinopyroxene ($Fs_{10.5\text{-}10.6}Wo_{46.2\text{-}46.4}$).
Classification: R4 chondrite.
Specimens: A total of 21.8 g of material and one polished thin section are on deposit at *UWB*. Mr. G. Fujihara holds the main mass.

Northwest Africa 7729 (NWA 7729)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (LL5)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, irregular dark weathered exterior. A saw-cut reveals scattered chondrules and sparse fine-grained metal/sulfide set in a reddish brown matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a numerous POP, PO chondrules, with plagioclase and/or mesostasis, matrix relatively fine-grained.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{29.3\pm0.6}$, Fe/Mn=59±3, n=15; low-Ca pyroxene $Fs_{23.8\pm1.3}Wo_{1.3\pm0.9}$, Fe/Mn=38±, n=12.

Classification: Ordinary chondrite (LL5), weathering grade W2.
Specimens: 23 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7730 (NWA 7730)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (LL3.4)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, smooth dark fusion crust. A saw-cut reveals many densely packed chondrules of variable size, many ~3 mm, several up to ~5 mm, sparse fine-grained metal/sulfide.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous unequilibrated chondrules, average size ~1 mm.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{23.0\pm9.4}$, Fe/Mn=55±18, Cr_2O_3=0.12±0.14 wt%, n=33; low-Ca pyroxene $Fs_{14.4\pm9.1}Wo_{1.0\pm1.4}$, Fe/Mn=28±16, n=39.
Classification: Ordinary chondrite (LL3.4), mean Fa,Fs-content and sigma consistent with type 3.4, weathering grade W1.
Specimens: 21 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7731 (NWA 7731)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (L3.00)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: Single stone, black weathered fusion crust, saw-cut reveals many densely packed chondrules of variable size, few fine-grained metal/sulfides.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous unequilibrated chondrules, many to 500 μm, range ~100-2000 μm, abundant fine-grained matrix, kamacite, Fe-oxides, and Fe-sulfide.
Geochemistry: (C. Agee, M. Spilde, L. Burkemper, *UNM*) Olivine range $Fa_{0.5\text{-}18.7}$, n=31, ferroan olivine $Fa_{10.0\pm3.4}$, Fe/Mn=34±17, Cr_2O_3=0.43±0.11 wt%, range Cr_2O_3=0.26-0.71 wt%, n=29; low-Ca pyroxene range $Fs_{0.6\text{-}13.4}$, n=31, ferroan low-Ca pyroxene $Fs_{8.0.\pm7.7}Wo_{0.4\pm0.3}$, Fe/Mn=22±18, n=18. Cr-distribution was observed in several ferroan olivines by single scan x-ray imaging, all grains showed uniformly high Cr concentration with no chromite needles or inclusions present. S-distribution was observed in several matrix regions by single scan x-ray imaging, all regions showed high S concentration fairly uniformly distributed in the matrix.
Classification: Ordinary chondrite (L3.00), type 3.00 based on ferroan olivine mean Cr_2O_3 content and sigma from Grossman and Brearley (2005), by lack of chromite inclusions in ferroan olivine, and by the presence of S-rich matrix.
Specimens: 16.5 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7732 (NWA 7732)
Morocco
Purchased: Aug 2012
Classification: Ordinary chondrite (H6)
History: Purchased by Adam Bates from a meteorite dealer in Morocco, August 2012.
Physical characteristics: 184 pieces ranging from 0.2-13 g, dark brown weathered exterior. A saw-cut reveals abundant fine-grained metal, also some metal grains up to 3 mm, set in a dark brown matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows equilibrated, recrystallized texture with few discernable chondrules. Ubiquitous troilite, metal, Fe-oxide, and plagioclase.

Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine $Fa_{19.3\pm0.6}$, Fe/Mn=40±2, n=13; low-Ca pyroxene $Fs_{16.9\pm0.2}Wo_{1.6\pm0.2}$, Fe/Mn=23±1, n=10.
Classification: Ordinary chondrite (H6), weathering grade W2.
Specimens: 21 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7747 (NWA 7747)
(Northwest Africa)
Purchased: 2012
Classification: HED achondrite (Eucrite, polymict)
Petrography: The grayish meteorite consists of basaltic and rare dark melt clasts set into a fine-grained clastic matrix of dominantly calcic plagioclase and exsolved pyroxene. Accessories include chromite, troilite and SiO_2 polymorphs.
Geochemistry: Ca-poor pyroxene: $Fs_{54.4\text{-}62.6}Wo_{3.1\text{-}15}$; FeO/MnO=30-33; augite: $Fs_{28.4\text{-}42.6}Wo_{25.6\text{-}43.1}$; FeO/MnO=31.35; calcic plagioclase: $An_{83.4\text{-}93.5}$

Northwest Africa 7755 (NWA 7755)
Morocco
Purchased: 2013
Classification: Martian meteorite (Shergottite)
History: Purchased by Matt Morgan and Lee Morgan in 2013 from a Moroccan meteorite dealer.
Physical characteristics: Single stone with black glassy fusion crust, with some light-colored desert sediment coating. A saw cut reveals poikilitic texture.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished epoxy mount shows ~45% olivine, ~35% pyroxene, ~20% maskelynite, ubiquitous Cr-Ti-Fe oxides. Pyroxenes and olivines are highly equilibrated, with no zonation in BSE images, heavily shocked, grain size ranges from 200-1000 µm.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) EMPA. Olivine $Fa_{38.5\pm0.8}$, Fe/Mn=48±2, n=38; pigeonite $Fs_{29.4\pm1.5}Wo_{10.4\pm2.4}$, Fe/Mn=28±1, n=33; augite $Fs_{18.2\pm1.2}Wo_{34.2\pm2.4}$, Fe/Mn=26±2, n=7; maskelynite $Or_{2.3\pm0.3}Ab_{46.0\pm2.3}An_{51.6\pm2.4}$ N=20. Oxygen Isotopes, laser fluorination (K. Ziegler, *UNM*), analyses on 3 acid-washed aliquots, 1.5, 1.4, 1.0 mg, gave values $\delta^{17}O$=2.988, 2.882, 2.735; $\delta^{18}O$=5.188, 4.886, 4.696; $\Delta^{17}O$=0.249, 0.302, 0.256 (linearized, all permil).
Classification: Achondrite (Martian, shergottite), petrologically equilibrated ultramafic rock, poikilitic shergottite group, with relatively high modal maskelynite, but lacking pyroxene crystallization trends seen in olivine-phyric basaltic shergottites. No known pairings, but pyroxene and olivine compositions are similar to RBT 04262.
Specimens: 6 g including microprobe mount on deposit *UNM*, Matt Morgan holds the main mass.

Northwest Africa 7756 (NWA 7756)
Tombouctou, Mali
Purchased: 2010
Classification: HED achondrite (Eucrite)
History: The meteorite was bought in early 2010 in Tombouctou, Mali, by Michel Meda.
Physical characteristics: A single oriented stone, almost entirely covered by fresh shiny fusion crust.
Petrography: (J. Gattacceca, *CEREGE*) Unbrecciated (at the scale of polished section), medium-grained variolitic basalt with phenocrysts of low-Ca pyroxenes up to 5 mm in a matrix of smaller pyroxenes and plagioclase. Low-Ca pyroxenes form clots. Minor phases include silica, FeS, chromite. FeS is present as small inclusions (<25 µm) and large grains up to 200 µm. Rare metal as small inclusions up to 25 µm.
Geochemistry: Mineral compositions: low-Ca pyroxene is zoned $Fs_{37.3\text{-}47.9}Wo_{20.8\text{-}8.1}$, mean FeO/MnO = 29.0, Plagioclase $An_{87.1}Or_{0.6}$ with mean FeO 0.45 wt.%. Chromite Cr/(Cr+Al)= 0.68. FeNi metal is Ni-poor (Ni = 0.5 wt.%). Magnetic susceptibility log χ = 2.53.
Classification: Achondrite (eucrite). No apparent weathering.
Specimens: 23 g and one polished section at *CEREGE*. N. Tourment holds the main mass.

Northwest Africa 7766 (NWA 7766)
(Northwest Africa)
Purchased: 2011
Classification: Enstatite chondrite (EL6)
History: Purchased by Nicola Castellano at the Torino Mineral Show, Italy.
Physical characteristics: A single piece weighing 71.9 g with no fusion crust.
Petrography: (V. Moggi Cecchi, G. Pratesi, S. Caporali, *MSP*): The thin section displays an equilibrated texture with traces of chondrules in a matrix consisting of pyroxene and minor plagioclase. Sub-parallel iron oxides/hydroxides veinlets 160 μm-wide are present. Indistinct chondrules are mainly RP. Opaque phases dominated by kamacite and troilite, markedly weathered to iron oxides. Accessory phases are alabandite and daubreelite as blades in troilite. The presence of alabandite and Si content of kamacite point to a classification as EL chondrite
Geochemistry: Orthopyroxene, $Fs_{0.6}En_{97.9}Wo_{1.4}$; plagioclase, $An_{12.9}Or_{3.8}$; Si in kamacite = 0.7 wt.%; Ti in troilite = 5.9 wt.%
Classification: Enstatite chondrite (EL6); S3; W4
Specimens: A total of 14.50 g and one thin section are on deposit at *MSP* (MSP 5234). Castellano holds the main mass.

Northwest Africa 7776 (NWA 7776)
Northwest Africa
Purchased: Nov. 2012
Classification: Ordinary chondrite (L5)
History: One fully crusted stone weighing 2370 g was found and purchased in Erfoud in November of 2012. Thomas *Webb* acquired the sample from a meteorite prospector in November 2012.
Physical characteristics: Dark-gray fusion crust covers 90% of the rounded ellipsoidal stone.
Petrography: (A. Love, *App*) Sample displays brecciated texture composed of 960 μm chondrules, chondrule fragments and recrystallized chondritic clasts set in a opaque dark matrix of recrystallized material. Some chondrules contain mesostasis that shows quench texture.
Geochemistry: (A. Love, *App*) Olivine, $Fa_{23.2\pm0.6}$ (N=18). Pyroxene, $Fs_{18.9\pm1.2}Wo_{2.4\pm1.4}$ (N=12). Plagioclase, $An_{11.6\pm0.7}$ (N=3).
Classification: L5, S4, W3
Specimens: 20 g and 1 polished thin section are on deposit at *App*

Northwest Africa 7777 (NWA 7777)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (H3.8)
History: Purchased by Sean Tutorow from a Moroccan meteorite dealer, 2012.
Physical characteristics: Single stone, smooth weathered fusion crust, sawn reveals chondrules and metal grains set in a dark matrix.
Petrography: (C. Agee, *UNM*): Microprobe examination of a polished mount shows numeous unequilibrated PO, PP, POP chondrules.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{20.0\pm2.6}$, Fe/Mn=46±7, n=11; low-Ca pyroxene $Fs_{12.6\pm6.4}Wo_{1.2\pm1.3}$, Fe/Mn=33±20, n=10, plagioclase $Or_{0.63}Ab_{30.3}An_{69.1.}$
Classification: Ordinary chondrite (H3.8), weathering grade W2.
Specimens: 21.4 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7778 (NWA 7778)
Morocco
Purchased: 2012

Classification: Ordinary chondrite (LL4-6)
History: Purchased by Sean Tutorow from a Moroccan meteorite dealer, 2012.
Physical characteristics: Two fusion crusted pieces that fit together. Interior shows a brecciated texture with dark and light clasts.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows two distinct lithologies corresponding to petrologic types 4 and 6. PO, POP chondrules are present in the type 4 lithology and whereas the type 6 lithology has indistinct chondrules. Ubiquitous plagioclase, troilite, kamacite, and chromite in both lithologies, Cl-rich apatite present only in type 6.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Clast type 6: Olivine $Fa_{28.7\pm0.9}$, Fe/Mn=56±4, n=7; low-Ca pyroxene $Fs_{24.1\pm0.6}Wo_{1.8\pm0.4}$, Fe/Mn=35±2, n=6; Clast type 4: Olivine $Fa_{30.2\pm2.1}$, Fe/Mn=62±5, n=7; low-Ca pyroxene $Fs_{23.4\pm1.0}Wo_{1.8\pm0.2}$, Fe/Mn=35±2, n=7.
Classification: Ordinary chondrite (LL4-6), breccia of type 4 and type 6 components, weathering grade W1.
Specimens: 20.4 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7779 (NWA 7779)
Morocco
Purchased: 2012
Classification: HED achondrite (Eucrite)
History: Purchased by Sean Tutorow from a Moroccan meteorite dealer in 2012
Physical characteristics: Single stone, with fresh black fusion crust, sawn surface reveals fresh, light-gray to tan colored, fine-grained texture.
Petrography: (C. Agee, *UNM*): Microprobe examination of a polished mount shows a pyroxene-plagioclase protogranular texture, pyroxenes have exsolution lamellae. Accessory silica, chromite, and troilite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*): Low Ca-pyroxene $Fs_{59.0\pm1.7}Wo_{3.7\pm1.7}$, Fe/Mn=31±1 n=22, augite $Fs_{25.9\pm3.3}Wo_{42.8\pm1.6}$, Fe/Mn=31±2, n=10, plagioclase $Or_{0.6\pm0.1}Ab_{10.7\pm0.3}An_{88.6\pm0.3}$, n=5.
Classification: Achondrite (eucrite). Equilibrated main group eucrite.
Specimens: 10 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7780 (NWA 7780)
Morocco
Purchased: 2012
Classification: HED achondrite (Eucrite)
History: Purchased by Sean Tutorow from a Moroccan meteorite dealer in 2012
Physical characteristics: Single stone, with black fusion crust, some weathering cracks, saw cut reveals fresh, light gray color, very fine-grained texture.
Petrography: (C. Agee, *UNM*): Microprobe examination of a polished mount shows a pyroxene-plagioclase protogranular texture, many pyroxenes have exsolution lamellae. Accessory silica, chromite, and troilite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*): Pyroxene range $Fs_{61.3\text{-}25.7}Wo_{1.7\text{-}44.1}$, Fe/Mn=31±1 n=31, plagioclase $Or_{0.4\pm0.1}Ab_{9.3\pm1.2}An_{90.3\pm1.3}$, n=5.
Classification: Achondrite (eucrite). Equilibrated main group eucrite.
Specimens: 5.4 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7781 (NWA 7781)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (L4)
History: Purchased by Sean Tutorow from a Moroccan meteorite dealer in 2012.

Physical characteristics: Single stone, brown exterior, saw cut reveals small metal grains set in light-brown matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a few PO, POP chondrules, some coarse-grained olivines in shock-melt, plagioclase up to 100 μm.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{25.6\pm1.6}$, Fe/Mn=49±5, n=5; low-Ca pyroxene $Fs_{21.6\pm1.7}Wo_{1.5\pm0.2}$, Fe/Mn=31±1, n=4.
Classification: Ordinary chondrite (L4), weathering grade W2.
Specimens: 38.1 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7782 (NWA 7782)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (LL4)
History: Purchased by Sean Tutorow from a Moroccan meteorite dealer in 2012.
Physical characteristics: Single stone, weathered exterior, light gray-yellow matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows PO, POP chondrules.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{26.9\pm0.6}$, Fe/Mn=55±3, n=37; low-Ca pyroxene $Fs_{20.2\pm3.2}Wo_{0.8\pm0.6}$, Fe/Mn=39±18, n=28.
Classification: Ordinary chondrite (LL4), weathering grade W2.
Specimens: 22.4 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7783 (NWA 7783)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (H6)
History: Purchased by Sean Tutorow from a Moroccan meteorite dealer in 2012.
Physical characteristics: Single stone, dark brown weathered exterior, saw cut reveals numerous fine metal grains set in a dark gray matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows an equilibrated chondrite texture with many oxide veinlets.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{19.0\pm0.6}$, Fe/Mn=38±2, n=6; low-Ca pyroxene $Fs_{16.7\pm0.1}Wo_{1.5\pm0.2}$, Fe/Mn=23±1, n=6.
Classification: Ordinary chondrite (H6), weathering grade W3.
Specimens: 24.9 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7784 (NWA 7784)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (H5)
History: Purchased by Sean Tutorow from a Moroccan meteorite dealer in 2012.
Physical characteristics: Single stone, fresh fusion crust, saw cut reveals numerous small metal grains set in a light-gray matrix, some metal clusters up to 3 mm.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows equilibrated PO, POP chondrules, plagioclase up to 100 μm, phosphate.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{20.1\pm1.3}$, Fe/Mn=43±4, n=6; low-Ca pyroxene $Fs_{17.5\pm1.4}Wo_{1.4\pm0.2}$, Fe/Mn=24±2, n=6.
Classification: Ordinary chondrite (H5), weathering grade W1.
Specimens: 24.3 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7785 (NWA 7785)
Morocco

Purchased: 2012
Classification: Ordinary chondrite (L6)
History: Purchased by Sean Tutorow from a Moroccan meteorite dealer in 2012.
Physical characteristics: Single stone, partial weathered fusion crust, saw cut reveals numerous fine metal grains set in a gray-brown matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows equilibrated PO, POP chondrules, ubiquitous plagioclase, troilite, kamacite, chromite, and merrillite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{24.2\pm0.5}$, Fe/Mn=48±2, n=7; low-Ca pyroxene $Fs_{20.1\pm0.3}Wo_{1.4\pm0.8}$, Fe/Mn=30±3, n=7.
Classification: Ordinary chondrite (L6), weathering grade W2.
Specimens: 24.2g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7786 (NWA 7786)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (LL6)
History: Purchased by Sean Tutorow from a Moroccan meteorite dealer in 2012.
Physical characteristics: Single stone, fusion crust, saw cut reveals brecciated texture, dark clasts set in gray matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows equilibrated PO, POP chondrules, plagioclase up to 150 μm, ubiquitous troilite, kamacite, chromite, Cl-rich apatite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{29.3\pm0.2}$, Fe/Mn=58±3, n=6; low-Ca pyroxene $Fs_{24.1\pm0.3}Wo_{2.2\pm0.1}$, Fe/Mn=36±2, n=7.
Classification: Ordinary chondrite (LL6), weathering grade W1.
Specimens: 23.6 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7789 (NWA 7789)
(Northwest Africa)
Purchased: Mar 2011
Classification: Ordinary chondrite (LL4)
History: The stone was purchased in Erfoud from Said Haddany and Ali Oulmaleh in March, 2011.
Physical characteristics: A ~60% fusion-crusted stone was recovered. Broken face exhibited gray interior, clasts, and large white chondrules. Fusion crust is black and textured. Large cut face exhibits numerous chondrules and visible clasts.
Petrography: Large cut face exhibits an LL4 breccia with metamorphosed LL clasts and some carbonaceous chondrite clasts.
Specimens: *JUtas*: 8 kg; *UCLA*: 233 g

Northwest Africa 7809 (NWA 7809)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Enstatite achondrite (Aubrite)
History: Purchased by Jason Utas in February 2013 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Physical characteristics: Light colored granular stone (230 g) with orange staining.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively equigranular aggregate of predominantly enstatite with accessory albite, Si-bearing kamacite, Ti-Cr-bearing troilite and daubreelite. The specimen is cross-cut by thin goethite veins.
Geochemistry: Enstatite ($Fs_{0.3\text{-}0.5}Wo_{0.1\text{-}0.4}$).
Classification: Aubrite.

Specimens: 20.1 g of material and one polished thin section are at *UWB*. The remaining material is held by *JUtas*.

Northwest Africa 7812 (NWA 7812)
(Northwest Africa)
Purchased: 2013 Mar
Classification: Angrite
History: Purchased by Darryl Pitt in 2013 March from a dealer in Erfoud, Morocco.
Physical characteristics: A single, rounded, black, fine grained stone (46.2 g). A round, smooth-walled vesicle was observed in one interior slice, and a small (stained) olivine xenocryst in another.
Petrography: (A. Irving and S. Kuehner, *UWS*; C. Agee, *UNM*) Porphyritic texture. Small, euhedral to subhedral, strongly-zoned olivine phenocrysts (0.3-0.8 mm long) and fairly homogeneous clinopyroxene phenocrysts (up to 0.45 mm long) set in a fine-grained groundmass dominated by bladed grains of kirschsteinite, anorthite, clinopyroxene, ulvöspinel and minor troilite in parallel intergrowth. Olivine phenocrysts exhibit skeletal growth habits, with incomplete closure of crystal domains. An olivine xenocryst contains inclusions of Cr-Al spinel and pentlandite, and is surrounded by olivine phenocrysts nucleated on its margin. Sparse secondary barite is present in the groundmass, and both barite and calcite are present in microfractures in the olivine xenocyst.
Geochemistry: Olivine xenocryst ($Fa_{8.8}Ln_{0.5}$, FeO/MnO = 175), olivine phenocryst core ($Fa_{14.4}Ln_{0.6}$, FeO/MnO = 127), olivine phenocryst rim ($Fa_{46.0}Ln_{1.5}$, FeO/MnO = 112), groundmass kirschsteinite ($Fa_{76.4\text{-}79.6}Ln_{8.8\text{-}12.2}$, FeO/MnO = 65-73), clinopyroxene phenocryst core ($Fs_{18.1}Wo_{55.0}$, FeO/MnO = 112), clinopyroxene phenocryst sector ($Fs_{24.1}Wo_{53.0}$, FeO/MnO = 84), groundmass clinopyroxene ($Fs_{30.6\text{-}32.4}Wo_{51.3\text{-}51.8}$, FeO/MnO = 82-106). Oxygen isotopes (K. Ziegler, *UNM*) Analysis of acid-washed interior subsamples by laser fluorination gave, respectively (all per mil), $\delta^{17}O$ = 2.000, 2.051, 1.957; $\delta^{18}O$ = 4.003, 4.068, 3.864; $\Delta^{17}O$ = -0.114, -0.097, -0.083 (for a TFL slope of 0.528).
Classification: Achondrite (angrite).
Specimens: 8.9 g of material and one polished thin section are on deposit at *UWB*; a further 0.4 g and one polished thin section are on deposit at *UNM*. *DPitt* holds the main mass.

Northwest Africa 7815 (NWA 7815)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Carbonaceous chondrite (CO3.1)
History: Purchased by *GHupé* in February 2013 from a dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Composed of very small, well-formed chondrules plus sparse, fine-grained CAIs and angular olivine grains in a dark brown, fine-grained matrix.
Geochemistry: Olivine ($Fa_{0.7\text{-}70.4}$; Cr_2O_3 in ferroan olivine = 0.16-0.53 wt.%, mean 0.25 wt.%, s.d. 0.12, N = 17), orthopyroxene ($Fs_{1.1\text{-}16.5}Wo_{0.9\text{-}4.6}$), clinopyroxene ($Fs_{1.3\text{-}2.7}Wo_{47.7\text{-}51.3}$).
Classification: Carbonaceous chondrite (CO3.1). Estimation of subtype based on the scheme of Grossman and Brearley (2005).
Specimens: A total of 20.2 g of material and one polished thin section are on deposit at *UWB*. *GHupé* holds the main mass.

Northwest Africa 7816 (NWA 7816)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ordinary chondrite (L4)
History: Purchased by *GHupé* in February 2013 from a Moroccan dealer at the Tucson Gem and Mineral Show.

Petrography: (A. Irving and S. Kuehner, *UWS*) Medium-sized, fairly well formed chondrules in a recrystallized matrix. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, stained kamacite and troilite.
Geochemistry: Olivine ($Fa_{24.8-24.9}$), orthopyroxene ($Fs_{21.0-21.3}Wo_{1.3-1.5}$), clinopyroxene ($Fs_{7.7-7.9}Wo_{45.7-45.4}$).
Classification: Ordinary chondrite (L4).
Specimens: A total of 24.4 g of material and one polished thin section are on deposit at *UWB*. *GHupé* holds the main mass.

Northwest Africa 7817 (NWA 7817)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ordinary chondrite (L4)
History: Purchased by *GHupé* in February 2013 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Medium-sized, well formed chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{26.4-26.5}$), orthopyroxene ($Fs_{22.2-22.9}Wo_{0.8-0.9}$), clinopyroxene ($Fs_{11.4}Wo_{37.0}$; $Fs_{10.2}Wo_{42.4}$).
Classification: Ordinary chondrite (L4).
Specimens: A total of 20.3 g of material and one polished thin section are on deposit at *UWB*. *GHupé* holds the main mass.

Northwest Africa 7818 (NWA 7818)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ordinary chondrite (LL5)
History: Purchased by *GHupé* in February 2013 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fairly sparse, large chondrules and partial chondrules in a recrystallized matrix. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, altered kamacite, taenite and troilite. Thin shock veins crosscut the specimen.
Geochemistry: Olivine ($Fa_{28.4-28.5}$), orthopyroxene ($Fs_{23.6-24.1}Wo_{1.4-1.8}$), clinopyroxene ($Fs_{7.6-8.1}Wo_{45.9-45.6}$).
Classification: Ordinary chondrite (LL5, moderately shocked).
Specimens: A total of 22.7 g of material and one polished thin section are on deposit at *UWB*. *GHupé* holds the main mass.

Northwest Africa 7820 (NWA 7820)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ordinary chondrite (LL6)
History: Purchased by *GHupé* in February 2013 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Mostly poikiloblastic texture with rare indistinct, partial chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{29.3-29.8}$), orthopyroxene ($Fs_{23.8-24.2}Wo_{3.4-2.9}$), clinopyroxene ($Fs_{10.2-10.8}Wo_{43.0-42.6}$).
Classification: Ordinary chondrite (LL6).
Specimens: A total of 10.6 g of material and one polished thin section are on deposit at *UWB*. *GHupé* holds the main mass.

Northwest Africa 7821 (NWA 7821)

(Northwest Africa)
Purchased: 2013 Feb
Classification: Carbonaceous chondrite (C2, ungrouped)
History: Purchased by *GHupé* in February 2013 from a dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very soft, fine grained specimen consisting of sparse tiny (0.1-0.4 mm), granular chondrules, mineral fragments and rimmed, amoeboid CAI in a brown, fine-grained matrix with possible cronstedtite and tochilinite. Some chondrules exhibit replacement by phyllosilicates. Anhydrous minerals include olivine, orthopyroxene, clinopyroxene, minor fresh kamacite and pentlandite.
Geochemistry: Olivine ($Fa_{0.7\text{-}41.9}$), orthopyroxene ($Fs_{0.6\text{-}32.3}Wo_{3.7\text{-}2.8}$), clinopyroxene ($Fs_{0.5}Wo_{33.0}$). Oxygen isotopes (D. Rumble, *CIW*): analyses of acid-washed subsamples gave, respectively $\delta^{17}O$ -2.98, -3.37; $\delta^{18}O$ 0.95, 0.38; $\Delta^{17}O$ -3.483, -3.574 per mil.
Classification: Carbonaceous chondrite (CM2-an). Oxygen isotopes do not plot with the values for other CM chondrites, but on an extension of that trend towards more ^{16}O-rich compositions, making this specimen anomalous.
Specimens: 7.6 g and one polished thin section are at *UWB*. The remainder is held by *GHupé*.

Northwest Africa 7822 (NWA 7822)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ungrouped achondrite
History: Purchased by Greg Hupé in February 2013 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Physical characteristics: A single stone (45.8 g) almost fully coated by dark fusion crust. The interior is mostly pale yellow with brown interstitial regions and sparse very small grains of fresh metal.
Petrography: (A. Irving and S. Kuehner, *UWS*) Coarse-grained plutonic assemblage of predominantly (>90 vol.%) olivine with accessory chromite, taenite and troilite, plus very minor interstitial clinopyroxene and sodic plagioclase.
Geochemistry: Olivine ($Fa_{28.8\text{-}29.4}$, FeO/MnO = 92-107), clinopyroxene ($Fs_{9.7\text{-}11.0}Wo_{45.5\text{-}44.3}$, FeO/MnO = 50-62). Oxygen isotopes (K. Ziegler, *UNM*): Analysis of acid-washed interior subsamples by laser fluorination gave, respectively (all per mil), $\delta^{17}O$ = -4.255, -4.390, -4.384; $\delta^{18}O$ = -0.710, -0.655, -0.635; $\Delta^{17}O$ = -3.850, -4.044, -4.049 (for a TFL slope of 0.528).
Classification: Achondrite ungrouped. FeO/MnO ratios in constituent olivine in this dunitic specimen are very similar to those for olivine in the Eagle Station pallasite, and oxygen isotope compositions are comparable with those for both CV chondrites and Eagle Station.
Specimens: 9.3 g of material and one polished thin section are on deposit at *UWB*. The main mass is held by *GHupé*.

Northwest Africa 7824 (NWA 7824)
(Northwest Africa)
Purchased: 2011 Oct
Classification: Mesosiderite
History: Purchased by Mike Bandli in October 2011 from a dealer in Erfoud, Morocco.
Physical characteristics: Exceptionally fresh specimen (59 g) with evident metal, sulfide and honey-yellow silicate grains.
Petrography: (A. Irving and S. Kuehner, *UWS*) Metamorphosed breccia composed of larger, angular monomineralic (and some polymineralic) clasts in a recrystallized matrix of related crystal debris. Composed of abundant orthopyroxene with interstitial anorthitic plagioclase, holly leaf-shaped grains of kamacite (~ 8 vol.%), Fe-sulfide (~ 4 vol.%), taenite, chromite and Na-bearing merrillite. The only evidence of terrestrial weathering is very slight staining on some fractures in pyroxene.

Geochemistry: Orthopyroxene ($Fs_{26.2\text{-}26.3}Wo_{1.9\text{-}1.5}$; FeO/MnO = 29-31). Oxygen isotopes (K. Ziegler, *UNM*): analyses of acid-washed silicate material by laser fluorination gave, respectively: $\delta^{17}O$ = 1.708, 1.684 $\delta^{18}O$ = 3.757, 3.718; $\Delta^{17}O$ = -0.276, -0.279 (all per mil).
Classification: Mesosiderite.
Specimens: 12 g of material and one polished thin section are at *UWB*. The remaining material is held by Mr. M. Bandli.

Northwest Africa 7825 (NWA 7825)
(Northwest Africa)
Purchased: 2012 Aug 19
Classification: HED achondrite (Diogenite)
Physical characteristics: A single stone partially covered with fusion crust. The interior is greenish.
Petrography: (J. Gattacceca, *CEREGE*) Coarse-grained orthopyroxenite composed of >99% orthopyroxene (up to 2 mm, mean 400 μm). Minor chromite, silica, troilite, kamacite. Olivine was not observed.
Geochemistry: Orthopyroxene $Fs_{25.1\pm0.4.2}Wo_{2.1\pm0.3}$ (FeO/MnO=30.6). Chromite Cr/(Cr+Al)=0.90. Magnetic susceptibility log χ = 3.52.
Classification: HED achondrite (Diogenite)
Specimens: 4.1 g and a polished section at *CEREGE*. Main mass with P. Thomas

Northwest Africa 7827 (NWA 7827)
(Northwest Africa)
Purchased: 2013 Jan
Classification: Ordinary chondrite (L4)
History: Purchased by Matthew Martin in January 2013 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Physical characteristics: A single stone (467.6 g) coated by extremely fresh, black fusion crust. The gray interior is crosscut by thin black, glassy veinlets.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very fresh equilibrated chondrite composed of mostly well-formed, chondrules in a fine- grained matrix; however, some chondrules are only partial spheres and appear to have been sheared. Minerals are olivine, orthopyroxene, subcalcic augite, augite, sodic plagioclase, chromite, kamacite and troilite.
Geochemistry: Olivine ($Fa_{24.7\text{-}24.8}$), orthopyroxene ($Fs_{21.4\text{-}21.5}Wo_{1.6}$), subcalcic augite ($Fs_{12.8}Wo_{29.7}$), augite ($Fs_{8.1}Wo_{45.3}$).
Classification: Ordinary chondrite (L4). The interior glassy veinlets are indicative of moderate shock.
Specimens: A total of 20.2 g of material and one polished thin section are on deposit at *UWB*. MMartin holds the main mass.

Northwest Africa 7828 (NWA 7828)
(Northwest Africa)
Purchased: 2013 Mar
Classification: Primitive achondrite (Brachinite)
History: Purchased in Temara, Morocco, by Adam Aaronson in December 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Protogranular assemblage of predominantly olivine with subordinate clinopyroxene, Ti-V-Al-bearing chromite and pyrrhotite. Some larger pyroxene grains contain rounded chadacrysts of olivine. Along the margins of olivine grains and also on interior fractures are distinctive arrays of intergrown pure Fe metal + orthopyroxene.
Geochemistry: Olivine ($Fa_{25.4\text{-}27.0}$; FeO/MnO = 41-52), clinopyroxene ($Fs_{10.6\text{-}10.7}Wo_{44.5\text{-}44.7}$; FeO/MnO = 25-29), orthopyroxene ($Fs_{20.8\text{-}21.0}Wo_{0.9\text{-}1.2}$; FeO/MnO = 32-33).

Classification: Achondrite (brachinite, anomalous). The reduction textures associated with olivine make this specimen distinct from typical brachinites. The very close similarity in textures and mineral compositions to those in NWA 7605 suggests that these are paired stones.
Specimens: 20.1 g of material and one polished thin section are at *UWB*. The remaining material is held by *Aaronson*.

Northwest Africa 7830 (NWA 7830)
(Northwest Africa)
Purchased: 2013 Mar
Classification: Carbonaceous chondrite (CK3)
History: Purchased in Ouarzazate, Morocco in March 2013 by Mohamed Aid.
Petrography: (A. Irving and S. Kuehner, *UWS*) Unequilibrated specimen consisting of separated, round chondrules (some rimmed by magnetite) in a relatively abundant red-brown matrix. Olivine, orthopyroxene, diopside, intermediate plagioclase, relatively abundant Cr-bearing magnetite (partly altered to iron hydroxide) and minor pentlandite.
Geochemistry: Olivine ($Fa_{10.4\text{-}33.1}$), orthopyroxene ($Fs_{1.4\text{-}21.9}Wo_{1.3\text{-}0.6}$), diopside ($Fs_{0.5\text{-}0.7}Wo_{44.2\text{-}44.1}$).
Classification: Carbonaceous chondrite (CK3).
Specimens: A total of 20.2 g of material and one polished thin section are on deposit at *UWB*. Mr. M. Aid holds the main mass.

Northwest Africa 7832 (NWA 7832)
(Northwest Africa)
Purchased: 2012
Classification: Ordinary chondrite (H6)
History: Purchased by Adam Aaronson in Temara, Morocco in 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Almost entirely recrystallized with very sparse, small remnant chondrules and chondrule fragments. Olivine, orthopyroxene, augite, sodic plagioclase, chromite, merrillite, altered kamacite and troilite. Subparallel, thin secondary veinlets of goethite are fairly abundant.
Geochemistry: Olivine ($Fa_{19.4\text{-}19.5}$), orthopyroxene ($Fs_{17.1\text{-}17.3}Wo_{1.1\text{-}1.4}$), augite ($Fs_{6.5\text{-}6.8}Wo_{44.7\text{-}44.3}$).
Classification: Ordinary chondrite (H6). Likely paired with NWA 7715.
Specimens: A total of 33 g of material and one polished thin section are on deposit at *UWB*. *Aaronson* holds the main mass.

Northwest Africa 7834 (NWA 7834)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Lunar meteorite (feldspathic breccia)
History: Purchased jointly by Darryl Pitt and David Gheesling in February 2013 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Breccia consisting of numerous mineral fragments and rare ophitic-textured mare basalt clasts in a vesicular, glassy matrix. Minerals are anorthite, olivine, unexsolved pigeonite, subcalcic augite, exsolved pigeonite, Ti-bearing chromite, Cr-bearing ulvöspinel, ilmenite, troilite, minor silica polymorph and tiny shred-like grains of kamacite.
Geochemistry: Olivine ($Fa_{32.3}$, FeO/MnO = 93; $Fa_{92.9}$, FeO/MnO = 83), pigeonite ($Fs_{28.8\text{-}35.4}Wo_{9.9\text{-}5.7}$; FeO/MnO = 52-56), subcalcic augite ($Fs_{18.0}Wo_{37.9}$; FeO/MnO = 46). Bulk composition (R. Korotev, *WUSL*): INAA of subsamples gave mean abundances of FeO 12.9 wt.%, and (in ppm) Sc 25, La 6.4, Sm 3.1, Eu 0.81, Yb 2.3, Th 0.9.
Classification: Lunar (mingled regolithic breccia).
Specimens: 20.2 g are at *UWB*. The remainder is with the owners.

Northwest Africa 7837 (NWA 7837)
Morocco
Purchased: 2012
Classification: Carbonaceous chondrite (CR2)
History: Purchased by Aziz Habibi in Morocco, 2012.
Physical characteristics: Single stone, dark weathered irregular surface with chondrules visible through desert patina, saw-cut surface shows many chondrules of variable size, some oxidized, set in a dark-colored matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous porphyritic chondrules some up to 5 mm, some rims decorated with metal/sulfide blebs. Abundant, fine-grained matrix.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Ferroan olivine $Fa_{3.8\pm1.6}$, range $Fa_{2.2\text{-}6.9}$, Fe/Mn=44±3, Cr_2O_3=0.13±0.10, CaO=0.17±0.10 wt%, n=25; forsterite olivine $Fa_{1.3\pm0.5}$, Cr_2O_3=0.16±0.12, CaO=0.28±0.21 wt%, n=13; enstatite $Fs_{1.3\pm0.4}Wo_{1.6\pm1.4}$, Fe/Mn=13±8, n=15; diopside $Fs_{1.3\pm0.8}Wo_{35.0\pm5.3}$, Fe/Mn=6±3, n=5; plagioclase $Or_{1.2}Ab_{22.6}An_{76.1.}$
Classification: Carbonaceous chondrite (CR2).
Specimens: 20.4 g including a probe mount on deposit at *UNM*, Aziz Habibi holds the main mass.

Northwest Africa 7838 (NWA 7838)
(Northwest Africa)
Purchased: 2012
Classification: Ordinary chondrite (H3)
History: A single stone weighing 120.8 g was found and purchased in Agadir in 2012. Thomas Webb acquired the sample from a meteorite prospector in November of 2012.
Physical characteristics: The stone is devoid of fusion crust, but the shape appears to show orientation formed during flight. Chondrules are readily visible on the surface of the stone.
Petrography: (A. Love, *App*): Sample displays numerous, well-defined 133-1972 μm (mean 630 μm, n=109), close-packed, type I and type II chondrules and fragments in a fine-grained opaque matrix. Several black, 0.73-2.2 mm opaque very fine-grained matrix lumps occur between the chondrules. Many chondrules display fine-grained rims (some up to 300 μm thick).
Geochemistry: (A. Love, *App*) Olivine, $Fa_{14.2\pm8.2}$ (N=24); pyroxene, $Fs_{9.2\pm5.7}Wo_{1.2\pm0.8}$ (N=15).
Specimens: 20.0 g and one thin section are on deposit at *App*.

Northwest Africa 7854 (NWA 7854)
(Northwest Africa)
Purchased: 2013
Classification: HED achondrite (Eucrite, polymict)
Petrography: The light grayish rock consists of basaltic and melt-clasts set into a fine-grained clastic matrix dominated by calcic plagioclase and exsolved pyroxene. Accessories include SiO_2, chromite, and trolite. Contains 2 to 3 vol% diogenitic material.
Geochemistry: low-Ca px: $Fs_{35.5\text{-}47.9}Wo_{1.3\text{-}4}$; FeO/MnO=28-32; Ca-px: $Fs_{18\text{-}32.2}Wo_{24\text{-}44.7}$; FeO/MnO=25-31; clacic plagioclase: $An_{85.3\text{-}92.2.}$

Northwest Africa 7867 (NWA 7867)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (LL7)
History: Purchased by Aziz Habibi in Morocco, 2012.
Physical characteristics: Single stone, weathered fusion crust, broken surface reveals scattered small clasts set in a fine-grained, friable, light-gray matrix.

Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a brecciated, recrystallized chondrite, no chondrules present. Numerous equilibrated chondrite clasts from 500 μm to 2 mm set in a fine-grained cataclastic matrix. Three distinct LL lithologies identified based on texture and olivine Fa-content.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Lithology-1: $Fa_{30.6\pm0.5}$, Fe/Mn=61±3, n=17; low-Ca pyroxene $Fs_{25.1\pm0.3}Wo_{2.2\pm0.6}$, Fe/Mn=37±1, n=13; lithology-2: $Fa_{32.5\pm0.3}$, Fe/Mn=65±3, n=8; low-Ca pyroxene $Fs_{26.6\pm0.5}Wo_{2.1\pm0.4}$, Fe/Mn=40±2, n=6; lithology-3: $Fa_{29.2\pm0.5}$, Fe/Mn=60±2, n=5; low-Ca pyroxene $Fs_{23.7\pm0.1}Wo_{1.9\pm1.5}$, Fe/Mn=35±1, n=3.
Classification: Ordinary chondrite (LL7), breccia, chondrules absent, weathering grade W1.
Specimens: 33 g including a probe mount on deposit at *UNM*, Aziz Habibi holds the main mass.

Northwest Africa 7869 (NWA 7869)
(Northwest Africa)
Purchased: Feb 2004
Classification: Ordinary chondrite (L3)
History: A rock was purchased by Dick Pugh from a Moroccan trader at the Tucson Gem and Mineral Show and donated to *Cascadia* in February, 2004.
Physical characteristics: Gray to brown bumpy surface with flatter and apparently broken edges.
Petrography: (K. Armstrong and A. Ruzicka, *Cascadia*) Chondritic texture with distinct edges for chondrules (diameter = 0.7±0.3 mm, mean and standard deviation) and a matrix that appears opaque in transmitted light. Metal and troilite abundances determined by pixel counting in reflected light images are 1.6±0.1 and 1.5±0.5 area%, respectively.
Geochemistry: Olivine $Fa_{23.8\pm5.1}$ Fe/Mn=53.7±9.4 (N=62) and low-Ca pyroxene $Wo_{2.3\pm1.9}$ $Fs_{13.7\pm6.3}$ Fe/Mn = 24.7±17.8 (N=30).
Classification: L3 (S3) W1 chondrite with estimated subtype 3.7-3.8.
Specimens: 94.3 g in four pieces and one polished thin section and butt are available at *Cascadia*.

Northwest Africa 7870 (NWA 7870)
(Northwest Africa)
Purchased: Feb 2004
Classification: Ordinary chondrite (L4)
History: The rock was obtained by Edwin Thompson from a Moroccan trader at the Tucson Gem and Mineral Show and a portion was donated to *Cascadia* in February 2004.
Physical characteristics: The rock has a grey and pitted/bumpy exterior, and appears grey in cut faces.
Petrography: (K. Armstrong and A. Ruzicka, *Cascadia*) The specimen shows chondritic texture with readily discernible chondrules (mean diameter = 0.5 ± 0.3 mm) and matrix that appears translucent in transmitted light. The abundance of metal and troilite as determined by pixel counting in reflected light images is 3.1±0.1 and 3.5±0.7 area%, respectively.
Geochemistry: Olivine $Fa_{25.3\pm1.2}$ Fe/Mn=47.4±6.5 (N=36) and low-Ca pyroxene $Wo_{1.6\pm0.2}$ $Fs_{16.2\pm6.4}$ Fe/Mn = 25.3±6.9 (N=25).
Classification: Mineral chemistry, chondrule sizes, and metal abundance are most consistent with an L4 chondrite.
Specimens: 14.6 g in two pieces and a polished thin section are on deposit at *Cascadia*; *Thompson* holds the main mass.

Northwest Africa 7871 (NWA 7871)
(Northwest Africa)
Purchased: Feb 2004
Classification: Ordinary chondrite (L6)
History: The rock was obtained by Edwin Thompson from a Moroccan trader at the Tucson Gem and Mineral Show and a portion was donated to *Cascadia* in February 2004.

Physical characteristics: The rock has facets with a brown, slightly bumpy exterior surface, rare remnant fusion crust, and a brownish interior in cut faces.
Petrography: (K. Armstrong and A. Ruzicka, *Cascadia*) The specimen shows granoblastic texture with indistinct chondrules (mean diameter = 0.4 ± 0. 3 mm) and transparent matrix. A metal-poor igneous-textured inclusion (up to 1.1 cm across) is present. About 20% of metal has been replaced by terrestrial weathering products; calcite produced by terrestrial weathering fills cracks. The abundance of metal and troilite determined by pixel counting in reflected light images is 3.5±0.8 and 2.7±1.5 area%, respectively.
Geochemistry: Olivine $Fa_{26.7\pm1.1}$ Fe/Mn=51.6±6.5 (N=40) and low-Ca pyroxene $Wo_{1.5\pm0.3}$ $Fs_{22.3\pm0.7}$ Fe/Mn = 29.7±2.56 (N=6).
Classification: Data permit L6 and LL6 designations but overall appearance and Fe/Mn of silicates are typical of L6. Weathering grade close to W1/2 boundary but probably more typical of W2.
Specimens: 30 g in two pieces, one polished thin section, and one butt are available at *Cascadia*. *Thompson* holds the main mass.

Northwest Africa 7872 (NWA 7872)
(Northwest Africa)
Purchased: Sept 2004
Classification: Ordinary chondrite (L3)
History: Marc Fries purchased an unclassified NWA meteorite on eBay and donated most of the sample to *Cascadia* on September 20, 2005.
Physical characteristics: Mainly gray exterior with one black fusion crusted side.
Petrography: (K. Armstrong and A. Ruzicka, *Cascadia*) The specimen shows chondritic texture with many relatively distinct, close-packed, sometimes glass-bearing chondrules (diameter = 0.7±0.4 mm, mean and standard deviation), and a matrix that appears opaque in transmitted light. A metal-poor igneous textured inclusion up to 4 mm across occurs adjacent to a centimeter-sized shock-blackened area. Metal and troilite abundances determined by pixel counting in reflected light images are 2.4±0.4 and 3±1 area%, respectively.
Geochemistry: Olivine $Fa_{25.9\pm5.4}$ Fe/Mn=50.1±12.7 (N=80), low-Ca pyroxene $Wo_{1.6\pm1.2}$ $Fs_{18.3\pm8.0}$ Fe/Mn=30.2±13.1 (N=61).
Classification: L3 (S4) W1 chondrite, estimated subtype 3.7-3.8.
Specimens: 11.2 g in two pieces, one polished thin section, and a stub are on deposit at *Cascadia*.

Northwest Africa 7873 (NWA 7873)
(Northwest Africa)
Purchased: Sept 2009
Classification: Ordinary chondrite (H5-6)
History: A single stone was purchased from Moroccan dealers by Ronnie McKenzie. Fred Olsen donated two large slices to *Cascadia* on June 30, 2010.
Physical characteristics: A fresh stone with no sign of oxidation; regmaglypts are present on 3 fusion crusted sides.
Petrography: (K. Armstrong and A. Ruzicka, *Cascadia*) The specimen has light-colored clasts with relatively indistinct chondrules, and a darker host that contains more distinct chondrules (mean diameter = 0.7 ± 0.4 mm) and a matrix that is opaque to translucent in transmitted light. Both portions are variably blackened by containing many small opaque minerals in short veins and melt pockets. The host contains a large (up to ~0.9 cm across) metal-poor igneous-textured inclusion with turbid glassy mesostasis, adjacent to a large (~0.7 cm across) composite metal-sulfide grain. Metal and troilite contents determined by point counting of reflected light images are 7±1 and 1.9±0.1 area%, respectively.
Geochemistry: Olivine in both light-colored clast and darker host portions is relatively equilibrated ($Fa_{18.5\pm0.4}$, Fe/Mn = 37.6±4.9, N=35); low-Ca pyroxene in the host is also equilibrated ($Wo_{1.1\pm0.2}$ $Fs_{16.7\pm1.0}$, Fe/Mn=23.2±3.2, N=12).
Classification: A shock-blackened genomict breccia with H5 host and H6 clasts.

Specimens: 44.3 g in two slices, two polished thin sections, and a polished mount are on deposit at *Cascadia*. Ronnie McKenzie holds the main mass.

Northwest Africa 7874 (NWA 7874)
Morocco
Purchased: Feb 2013
Classification: HED achondrite (Eucrite)
History: Purchased by Mendy Ouzillou and an anonymous collector from a Moroccan meteorite dealer, February 2013.
Physical characteristics: Single stone, shiny black fusion crust, saw cut reveals fresh, light-gray, fine-grained groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a protogranular texture with ~50% pyroxene and 45% plagioclase, grain size 10-100 μm, many pyroxenes with exsolution lamellae. Accessory silica, ilmenite, and chromite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Low Ca-pyroxene $Fs_{60.6\pm1.7}Wo_{3.0\pm1.9}$, Fe/Mn=33±1, n=14; high-Ca pyroxene $Fs_{27.6\pm0.6}Wo_{42.3\pm0.8}$, Fe/Mn=34±1; n=7; plagioclase $Or_{0.5\pm0.0}Ab_{10.9\pm0.5}An_{88.7\pm0.5}$, n=3.
Classification: Achondrite (Eucrite). Equilibrated main group eucrite.
Specimens: 20.8 g including a probe mount on deposit at *UNM*, Mendy Ouzillou and an anonymous collector hold the main mass.

Northwest Africa 7875 (NWA 7875)
Morocco
Purchased: Feb 2013
Classification: Ordinary chondrite (H7)
History: Purchased by Mendy Ouzillou from a Moroccan meteorite dealer, February 2013.
Physical characteristics: Single stone, dark-brown exterior, saw cuts reveal many sub-millimeter metal blebs, but a few up to 3 mm, set in a fine-grained, dark-brown, crystalline matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a recrystallized chondritic texture though lacking chondrules. Plagioclase up to 200 μm, numerous texturally equilibrated metal domains 300-500 μm, ~50% of metal is oxidized, oxide veinlets throughout.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) $Fa_{19.2\pm0.1}$, Fe/Mn=39±1, n=5; low-Ca pyroxene $Fs_{16.5\pm0.3}Wo_{4.2\pm0.8}$, Fe/Mn=24±1, n=6; high-Ca pyroxene $Fs_{9.2\pm0.2}Wo_{37.4\pm1.0}$, Cr_2O_3=1.32 wt%, Fe/Mn=19±1, n=2; plagioclase $Ab_{70}An_{27}Or_2$.
Classification: Ordinary chondrite (H7), type 7 based on high Wo-content in orthopyroxene and absence of chondrules, weathering grade W2.
Specimens: 21 g including a probe mount on deposit at *UNM*, Mendy Ouzillou holds the main mass.

Northwest Africa 7876 (NWA 7876)
(Northwest Africa)
Purchased: 2012 Oct
Classification: Ordinary chondrite (L3.1)
History: Purchased by F. Kuntz in October 2012 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed chondrules and sparse angular olivine grains in a finer grained matrix.
Geochemistry: Olivine ($Fa_{0.3\text{-}57.9}$; Cr_2O_3 in ferroan olivine = 0.13-0.72 wt.%, mean 0.25, sd 0.17, N = 13), orthopyroxene ($Fs_{2.7\text{-}28.0}Wo_{0.5\text{-}3.6}$), pigeonite ($Fs_{13.9}Wo_{9.4}$), subcalcic augite ($Fs_{14.4}Wo_{34.1}$).
Classification: Ordinary chondrite (L3.15). Estimation of subtype based on the scheme of Grossman and Brearley (2005).
Specimens: Type specimen plus one polished thick section on deposit with *PSF*; main mass with *Kuntz*.

Northwest Africa 7877 (NWA 7877)

(Northwest Africa)
Purchased: 2012 Dec
Classification: HED achondrite (Eucrite, polymict)
History: Purchased by *F. Kuntz* in December 2012 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh fragmental breccia. Petrographic examination shows abundant mineral debris with sparse clasts of basaltic, quenched, and gabbroic eucritic lithologies. Section also contains minor amounts (approximately 7 vol.% based on BSE image analysis) of diogenitic orthopyroxene. Other minerals are calcic plagioclase, pigeonite (some with fine augite exsolution lamellae), ilmenite, Ti-chromite, troilite, fayalite, Ni-poor metal and rare, irregular grains of Ni-poor kamacite.
Geochemistry: Diogenitic orthopyroxene ($Fs_{24.6}Wo_{2.0}$; FeO/MnO = 32), pigeonite ($Fs_{36.8}Wo_{6.2}$; FeO/MnO = 30), clinopyroxene lamella in exsolved pigeonite ($Fs_{29.3}Wo_{42.3}$; FeO/MnO = 35).
Classification: Eucrite (polymict breccia).
Specimens: Type specimen plus one polished thick section on deposit with *PSF*; main mass with *Kuntz*.

Northwest Africa 7878 (NWA 7878)
(Northwest Africa)
Purchased: 2012 Jun
Classification: Ordinary chondrite (L4)
History: Purchased by F. Kuntz in June 2012 from a Moroccan dealer at the Ensisheim Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively large, well-formed chondrules and dispersed relatively large grains of altered metal in a recrystallized matrix.
Geochemistry: Olivine ($Fa_{24.4\text{-}24.9}$), orthopyroxene ($Fs_{20.6\text{-}21.0}Wo_{3.1\text{-}1.5}$), clinopyroxene ($Fs_{7.6\text{-}7.7}Wo_{46.7\text{-}45.3}$).
Specimens: Type specimen plus one polished thick section on deposit with *PSF*; main mass with *Kuntz*.

Northwest Africa 7879 (NWA 7879)
(Northwest Africa)
Purchased: 2012 Oct
Classification: Carbonaceous chondrite (CV3)
History: Purchased by F. Kuntz in October 2012 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Round to irregular granular chondrules and amoeboid, fine-grained CAI in a relatively coarse dark reddish-brown matrix.
Geochemistry: Olivine ($Fa_{1.3\text{-}18.6}$), orthopyroxene ($Fs_{1.4\text{-}11.0}Wo_{0.5\text{-}0.9}$), augite ($Fs_{0.8}Wo_{40.3}$), Al-Ti-diopside in CAI ($Fs_{0.7}Wo_{59.2}$).
Classification: Carbonaceous chondrite (CV3).
Specimens: Type specimen plus one polished thick section on deposit with *PSF*; main mass with *Kuntz*.

Northwest Africa 7880 (NWA 7880)
(Northwest Africa)
Purchased: 2012 Oct
Classification: Ureilite
History: Purchased by F. Kuntz in October 2012 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Medium-grained protogranular aggregate of olivine and orthopyroxene (both with narrow, black metal-rich zones along their margins).
Geochemistry: Olivine (core $Fa_{21.0}$, Cr_2O_3 0.8 wt.%; rim 14.0), orthopyroxene (core $Fs_{20.1}Wo_{4.2}$; rim $Fs_{9.5}Wo_{4.1}$).
Classification: Ureilite.
Specimens: Type specimen plus one polished thick section on deposit with *PSF*; main mass with *Kuntz*.

Northwest Africa 7881 (NWA 7881)
(Northwest Africa)

Purchased: 2012 Oct
Classification: HED achondrite (Eucrite)
History: Purchased by F. Kuntz in October 2012 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh, fragmental genomict breccia composed of clasts with basaltic to diabasic textures and related crystal debris. All components contain similar distinctive, pale brown exsolved pigeonite. Other constituent minerals are calcic plagioclase,
Geochemistry: Orthopyroxene host ($Fs_{69.2\text{-}72.0}Wo_{1.9\text{-}1.7}$; FeO/MnO = 31-32), clinopyroxene exsolution lamellae ($Fs_{31.2\text{-}32.2}Wo_{45.0\text{-}42.6}$; FeO/MnO = 32-33).
Classification: Eucrite (genomict breccia, ferroan). All the pyroxenes in this specimen are compositionally similar and distinctly ferroan by comparison with typical eucrites.
Specimens: Type specimen plus one polished thick section on deposit with *PSF*; main mass with *Kuntz*.

Northwest Africa 7882 (NWA 7882)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ureilite
History: Purchased by Alexandre Debienne in February 2013 from a dealer in Agadir, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Protogranular assemblage of olivine (with reduced rims containing pure Fe metal) and pigeonite. Minor secondary calcite is present.
Geochemistry: Olivine (core $Fa_{21.3\text{-}21.4}$, rim $Fa_{4.5}$), pigeonite ($Fs_{17.3\text{-}17.5}Wo_{7.7\text{-}7.8}$).
Classification: Ureilite.
Specimens: Type specimen plus one polished probe mount at *PSF*; main mass with A. Debienne.

Northwest Africa 7883 (NWA 7883)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Carbonaceous chondrite (CO3)
History: Purchased by Alexandre Debienne in February 2013 from a dealer in Agadir, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively small (0.2-0.4 mm), magnesian chondrules and sparse CAI (containing gehlenite, anorthite, hedenbergite, spinel and perovskite) set in a matrix containing more ferroan olivine, troilite and taenite.
Geochemistry: Olivine ($Fa_{0.4\text{-}48.1}$, N = 5; Cr_2O_3 in ferroan examples = 0.08-0.62 wt.%), orthopyroxene ($Fs_{1.7\text{-}5.2}Wo_{1.8\text{-}3.9}$), subcalcic augite ($Fs_{0.8}Wo_{35.0}$).
Classification: Carbonaceous chondrite (CO3).
Specimens: Type specimen plus one polished thin section at *PSF*; main mass with A. Debienne.

Northwest Africa 7884 (NWA 7884)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Carbonaceous chondrite (CK6)
History: Purchased by Alexandre Debienne in February 2013 from a dealer in Agadir, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Mostly recrystallized with rare chondrule remnants. Olivine, clinopyroxene, orthopyroxene, intermediate plagioclase, Cr-bearing magnetite, pentlandite. Minor secondary calcite and barite.
Geochemistry: Olivine ($Fa_{30.7\text{-}31.2}$), orthopyroxene ($Fs_{25.6\text{-}26.1}Wo_{1.0\text{-}0.8}$), clinopyroxene ($12.7\text{-}16.3Wo_{47.4\text{-}49.0}$).
Classification: Carbonaceous chondrite (CK6).
Specimens: Type specimen plus one polished probe mount at *PSF*; main mass with A. Debienne.

Northwest Africa 7885 (NWA 7885)
(Northwest Africa)

Purchased: 2013 Feb
Classification: Ordinary chondrite (L6)
History: Purchased by Alexandre Debienne in February 2013 from a dealer in Agadir, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Rare chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, altered kamacite, taenite and troilite.
Geochemistry: Olivine ($Fa_{24.7\text{-}24.9}$), orthopyroxene ($Fs_{20.1\text{-}20.4}Wo_{1.4\text{-}1.5}$), clinopyroxene ($Fs_{6.9\text{-}8.5}Wo_{45.8\text{-}44.0}$).
Classification: Ordinary chondrite (L6).
Specimens: Type specimen plus one polished probe mount at *PSF*; main mass with A. Debienne.

Northwest Africa 7886 (NWA 7886)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ordinary chondrite (L6)
History: Purchased by Alexandre Debienne in February 2013 from a dealer in Agadir, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Rare chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, altered kamacite, taenite iron sulfide and chlorapatite.
Geochemistry: Olivine ($Fa_{24.9\text{-}25.3}$), orthopyroxene ($Fs_{20.3\text{-}20.7}Wo_{1.2\text{-}1.1}$), clinopyroxene ($Fs_{7.7\text{-}8.7}Wo_{44.1\text{-}42.8}$).
Classification: Ordinary chondrite (L6).
Specimens: Type specimen plus one polished thin section at *PSF*; main mass with A. Debienne.

Northwest Africa 7887 (NWA 7887)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Carbonaceous chondrite (CV3)
History: Purchased by Alexandre Debienne in February 2013 from a dealer in Agadir, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Large (up to 1.4 mm), separated granular chondrules plus fine grained CAI (containing perovskite, gehlenite and spinel) occur in a more ferroan matrix.
Geochemistry: Olivine ($Fa_{0.5\text{-}51.5}$, N = 8), orthopyroxene ($Fs_{1.2\text{-}1.8}Wo_{1.2\text{-}1.3}$), subcalcic augite ($Fs_{1.5}Wo_{33.7}$), diopside ($Fs_{0.4}Wo_{50.0}$).
Classification: Carbonaceous chondrite (CV3).
Specimens: Type specimen plus one polished probe mount at *PSF*; main mass with A. Debienne.

Northwest Africa 7888 (NWA 7888)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ordinary chondrite (LL7)
History: Purchased by Alexandre Debienne in February 2013 from a dealer in Agadir, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Completely recrystallized assemblage of olivine, orthopyroxene, clinopyroxene, sodic plagioclase, Ti-bearing chromite, iron sulfide, altered kamacite and taenite.
Geochemistry: Olivine ($Fa_{31.8\text{-}32.0}$, FeO/MnO = 90-95), orthopyroxene ($Fs_{25.2\text{-}25.3}Wo_{1.7\text{-}2.2}$), clinopyroxene ($Fs_{9.5\text{-}11.1}Wo_{44.0\text{-}42.2}$).
Classification: Ordinary chondrite (LL7).
Specimens: Type specimen plus one polished probe mount at *PSF*; main mass with A. Debienne.

Northwest Africa 7889 (NWA 7889)
(Northwest Africa)
Purchased: 2013 Feb
Classification: HED achondrite (Eucrite)
History: Purchased by Alexandre Debienne in February 2013 from a dealer in Agadir, Morocco.

Petrography: (A. Irving and S. Kuehner, *UWS*) Microgabbroic igneous texture. Composed of calcic plagioclase, exsolved pigeonite, silica polymorph, ilmenite, Ti-poor chromite, Ti-rich chromite and troilite.
Geochemistry: Orthopyroxene host ($Fs_{56.9\text{-}57.1}Wo_{3.4\text{-}1.8}$, FeO/MnO = 30-31), clinopyroxene exsolution lamellae ($Fs_{24.1\text{-}25.2}Wo_{43.3\text{-}43.0}$, FeO/MnO = 28-29).
Classification: Eucrite (microgabbroic).
Specimens: Type specimen plus one polished probe mount at *PSF*; main mass with A. Debienne.

Northwest Africa 7891 (NWA 7891)
Morocco
Purchased: 2012
Classification: Carbonaceous chondrite (CV3, anomalous)
History: Purchased by Aziz Habibi in Morocco, 2012.
Physical characteristics: Single stone, dark weathered fusion crust, saw-cut reveals many chondrules and CAIs of variable size.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous PO and POP chondrules, many with irregular shapes, set in fine-grained groundmass.
Geochemistry: (C. Agee, *UNM*) Type I chondrule olivine $Fa_{0.8\pm0.3}$, Cr_2O_3=0.18±0.08, CaO=0.44±0.19 wt%, n=9, Type II chondrule olivine $Fa_{10.6\pm10.0}$, range $Fa_{1.9\text{-}40.2}$, Fe/Mn=69±69, Cr_2O_3=0.12±0.14, CaO=0.20±0.12 wt%, n=25; enstatite $Fs_{1.1\pm0.2}Wo_{1.9\pm0.9}$, n=23; diopside $Fs_{2.8\pm2.6}Wo_{34.5\pm0.7}$, n=4. (Karen Ziegler, *UNM*) Oxygen isotope mean values of analyses on four acid-washed aliquots of bulk sample, 0.9, 1.2, 1.5, 1.4 mg, gave $\delta^{17}O$= -18.662, -15.455, -7.616, -6.818, $\delta^{18}O$= -15.420, -11.700, -4.201, -2.390, $\Delta^{17}O$= -10.520, -9.277, -5.398, -5.556 (linearized, all permil).
Classification: Carbonaceous chondrite, CV3 anomalous, based on wide range of O-isotope values, all on the CCAM line, in particular three bulk analyses with low values far outside the CV3 range, also mean value Fe/Mn of ferroan olivines is anomalously low with relatively high standard deviation.
Specimens: 20.25 g including a probe mount on deposit at *UNM*, Aziz Habibi holds the main mass.

Northwest Africa 7892 (NWA 7892)
Morocco
Purchased: 2012
Classification: Carbonaceous chondrite (CO3.0)
History: Purchased by Abdelhadi Aithiba in Morocco, 2012.
Physical characteristics: Single stone, distinctive polygonal, dark brown weathered fusion crust, saw-cut reveals many small chondrules in a very fine-grained dark-brown matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows many PP, POP, and PO chondrules, most 50-300 µm, irregular shaped or fragmental chondrules common.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Random chondrule olivine range $Fa_{0.3\text{-}56.8}$, mean=$Fa_{17.5}$, n=22, chondrule ferroan olivine mean $Fa_{30.7\pm13.4}$, Cr_2O_3=0.39±0.19 wt%, Fe/Mn=95±25, n=35; low-Ca pyroxene range $Fs_{0.8\text{-}41.3}$, mean $Fs_{8.0}$, n=17; aluminous diopside Al_2O_3=8.76 wt%. (Karen Ziegler, *UNM*) Oxygen isotope mean values of analyses on 2 acid-washed aliquots of bulk sample, 1.2, 1.1 mg, gave $\delta^{17}O$= -8.851, -9.836, $\delta^{18}O$= -5.849, -6.906, $\Delta^{17}O$= -5.763, -6.190, (linearized, all permil).
Classification: Carbonaceous chondrite (CO3.0) estimated 3.05, based on mean Cr_2O_3=0.39 wt% in 35 chondrule ferroan olivines which is higher than that measured in the most primitive CO3 chondrite currently known (ALH 77307), but with higher standard deviation (σ-Cr_2O_3), analogous to the higher σ-Cr_2O_3 reported in type 3.05 ordinary chondrites QUE 97008, MET 00526, and EET 90161 (Grossman and Brearley, 2005). Oxygen isotopes values significant lower than literature CO bulk values, and slightly above the CCAM.
Specimens: 21 g including a probe mount on deposit at *UNM*, Abdelhadi Aithiba holds the main mass.

Northwest Africa 7893 (NWA 7893)

Errachidia, Morocco
Found: 2012
Classification: Rumuruti chondrite (R5)

History: Fragments of the stone were bought on November 19, 2012 and on May 13, 2013 close to Boudnib, Morocco, where the meteorites was found.

Physical characteristics: Many fragments, apparently from a single stone, most of them with fresh fusion crust. The interior is gray. Cut surfaces reveal dark and light angular clasts up to one cm.

Petrography: (J. Gattacceca, *CEREGE*) A brecciated chondrite showing indistinct chondrules and chondrule frements in a recrystallized matrix. The dominant minerals are olivine, plagioclase, Ca-pyroxene, sulfides (pentlandite, pyrrhotite, troilite), chromite, orthopyroxene. Plagioclase mean size is 21±10 μm. The dark clasts visible on the cut surfaces were not present on the studied section and have not been studied.

Geochemistry: The meteorite is equilibrated. Olivine $Fa_{37.4\pm0.2}$ (FeO/MnO=83, mean NiO 0.22 wt.%); Plagioclase $Ab_{85.0\pm1.3}Or_{4.7\pm1.7}An_{10.3\pm2.6}$; Ca-pyroxene $Fs_{10.5\pm0.3}Wo_{46.3\pm0.4}$; Orthopyroxene $Fs_{29.2\pm0.1}Wo_{0.9\pm0.1}$ (FeO/MnO=54); chromite Cr#=0.86, mean TiO_2 in chromite is 6.2 wt.%. Magnetic susceptibility log χ = 2.95.

Classification: Rumuruti chondrite (R5)

Specimens: 20 g and a polished section at *CEREGE*. 55 g with P. Thomas. More material may be with the finder in Morocco.

Northwest Africa 7894 (NWA 7894)
(Northwest Africa)
Purchased: Jan 2011
Classification: HED achondrite (Diogenite)

History: Bought on eBay in April 2012 from a seller who traded it as a single stone in January 2011.

Physical characteristics: A single broken stone, ~70% covered by shiny fusion crust. Broken surface reveal a grayish interior with greenish, whitish and dark clasts up to a few mm in size set in a light-gray matrix.

Petrography: (J. Gattacceca, *CEREGE*): Breccia composed predominantly of diogenitic material and less than 10 vol. % of basaltic eucrite clasts up to 2 mm. The dominant minerals are orthopyroxene, plagioclase, olivine. Silica, chromite, and troilite. Rare metal.

Geochemistry: Orthopyroxene $Fs_{23.5\pm2.6}$ $Wo_{2.4\pm0.7}$ FeO/MnO=30.3, Plagioclase $An_{89.7}Or_{0.3}$, Olivine $Fa_{40.9\pm0.9}$ FeO/MnO = 51.0. Chromite Cr/(Cr+Al)= 0.79

Classification: HED achondrite (diogenite, polymict breccia). Minimal weathering.

Specimens: 9 g and a polisehd section at *CEREGE*. Main mass with R. Lenssen.

Northwest Africa 7896 (NWA 7896)
Morocco
Purchased: 2012 Aug 19
Classification: HED achondrite (Diogenite)

History: The stone was bought in Erfoud, Morocco, in August 2012.

Physical characteristics: A single stone partially covered with fusion crust. Cut surfaces reveal a brecciated texture, with a range of clast sizes (from mm to cm) and colors (white, brownish, black) set in a light gray matrix.

Petrography: (J. Gattacceca, *CEREGE*) Breccia composed of rock and mineral fragments to cm in a clastic matrix. Some basaltic eucrite clasts, with modal abundance < 10 %. Main minerals are orthopyroxene, plagioclase, chromite. Rare metal.

Geochemistry: Orthopyroxene $Fs_{23.6\text{-}32.1}$, $Wo_{2.0\text{-}3.1}$, FeO/MnO= 31.6. Plagioclase $An_{89.7}Ab_{9.8}Or_{0.4.}$ Chromite Cr/(Cr+Al)=0.80. Magnetic susceptibility log χ = 3.01. Basaltic eucrite clast OPX $Fs_{41.7}Wo_{1.6}$ (FeO/MnO=33).

Classification: HED achondrite (diogenite, polymict breccia). Moderate weathering.

Specimens: 20 g and a polished section at *CEREGE*. Main mass with P. Thomas.

Northwest Africa 7898 (NWA 7898)
Morocco
Purchased: Dec 2012
Classification: Carbonaceous chondrite (CK5)
History: Purchased by Jack Schrader from a meteorite dealer in Erfoud, Morocco, December 2012.
Physical characteristics: Single stone, black fusion crust, saw cut reveals chondrules of variable size set in a dark gray matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows distinct, equilibrated PO, POP chondrules, many in the range 300-800 μm, but some >1 mm. Chondrules commonly mantled by plagioclase or opaques. Ubiquitous high-Ca pyroxene, pigeonite, and Cr-rich magnetite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{31.0\pm0.3}$, Fe/Mn=113±7, NiO=0.52±0.06 wt%, n=31; low-Ca pyroxene $Fs_{28.0\pm1.0}Wo_{1.1\pm1.3}$, Fe/Mn=78±5, n=14; plagioclase $Or_{2\pm1}Ab_{61\pm15}An_{36\pm16}$, n=4; magnetite Cr_2O_3=3.8 wt%, n=2.
Classification: Carbonaceous chondrite (CK5), CK based on olivine Ni-content, Fa and Fe/Mn, presence of Cr-magnetite, and intermediate plagioclase composition. Type 5 based on olivine and pyroxene compositions with relatively low Fa,Fs-sigma.
Specimens: 20 g including a probe mount on deposit at *UNM*, Jack Schrader holds the main mass.

Northwest Africa 7899 (NWA 7899)
Morocco
Purchased: 2011
Classification: Ordinary chondrite (L6)
History: Purchased by Blaine Reed in Denver, 2011.
Physical characteristics: Single stone, weathered fusion crust, saw cut reveals a coarse-grained breccia, numerous cm-sized clasts, dark shock veins, abundant fine-grained metal/sulfide.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous texturally equilibrated chondrules, but also regions of finely disseminated metal/sulfide and melt veins. Ubiquitous troilite and Fe,Ni metal.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{24.5\pm0.3}$, Fe/Mn=50±1, n=7; low-Ca pyroxene $Fs_{21.7\pm0.5}Wo_{1.7\pm0.4}$, Fe/Mn=30±1, n=6.
Classification: Ordinary chondrite (L6), weathering grade W1.
Specimens: 28.4 g including a probe mount on deposit at *UNM*, *Reed* holds the main mass.

Northwest Africa 7900 (NWA 7900)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (LL6)
History: Purchased by Blaine Reed in Tucson, 2013.
Physical characteristics: Single stone, weathered black fusion crust, saw cut reveals breccia, with many dark angular clasts, up to ~1-cm, set in light-gray, fine-grained matrix, some oxidized.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous texturally equilibrated clasts set in a brecciated, cataclastic matrix. Accessory high-Ca pyroxene, chromite, troilite, and Fe,Ni metal.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Groundmass: olivine $Fa_{32.1\pm0.2}$, Fe/Mn=60±2, n=6; low-Ca pyroxene $Fs_{25.2\pm0.2}Wo_{1.9\pm0.1}$, Fe/Mn=38±2, n=5; clasts: olivine $Fa_{31.8\pm0.3}$, Fe/Mn=64±1, n=6; low-Ca pyroxene $Fs_{25.2\pm0.6}Wo_{2.0\pm0.1}$, Fe/Mn=37±1, n=5.
Classification: Ordinary chondrite (LL6), monomict breccia, although the clasts and groundmass are texturally distinct, they are geochemically identical based on olivine and pyroxenes compositions, weathering grade W2.

Specimens: 35.4 g including a probe mount on deposit at *UNM*, *Reed* holds the main mass.

Northwest Africa 7901 (NWA 7901)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (H6)
History: Purchased by Blaine Reed in Tucson, 2013.
Physical characteristics: Single stone, weathered fusion crust, saw cut reveals densely packed small chondrules, but also one chondrule with apparent diameter ~5 mm, abundant fine-grained metal set in a dark-gray groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous texturally equilibrated chondrules, ~20% Fe,Ni metal and oxidized Fe,Ni metal. Accessory troilite and Cl-rich apatite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{19.5\pm0.2}$, Fe/Mn=39±1, n=6; low-Ca pyroxene $Fs_{17.0\pm0.2}Wo_{1.3\pm0.2}$, Fe/Mn=22±1, n=5.
Classification: Ordinary chondrite (H6), weathering grade W2.
Specimens: 29.7 g including a probe mount on deposit at *UNM*, *Reed* holds the main mass.

Northwest Africa 7902 (NWA 7902)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (L3.7)
History: Purchased by Blaine Reed in Tucson, 2013.
Physical characteristics: Single stone, weathered fusion crust, saw cut reveals densely packed chondrules of various size, one radial chondrule ~3 mm, dark-brown groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous porphyritic chondrules, Fe-oxide veinlets throughout.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{23.3\pm5.0}$, range $Fa_{1.5\text{-}32.0}$, Fe/Mn=52±6, n=26; low-Ca pyroxene $Fs_{13.7\pm8.0}Wo_{1.4\pm1.6}$, range $Fs_{1.4\text{-}34.7}$, Fe/Mn=29±19, n=30; plagioclase $An_{74.}$
Classification: Ordinary chondrite (L3.7), subtype based on sigma-Fa, subtype from sigma-Fs is ~L3.4. weathering grade W2.
Specimens: 27.7 g including a probe mount on deposit at *UNM*, *Reed* holds the main mass.

Northwest Africa 7903 (NWA 7903)
Morocco
Purchased: 2013
Classification: HED achondrite (Eucrite, monomict)
History: Purchased by Adam Aaronson in 2013.
Physical characteristics: Single stone, black fusion crust, saw cut reveals brecciated texture, a few cm-sized clasts and mm-sized pyroxene and plagioclase crystals set in a fine-grained, gray matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows evidence of shock with large (~1 mm), fractured, pyroxene and plagioclase grains set in a cataclastic groundmass. Most pyroxenes show exsolution lamellae. Silica-troilite domains throughout.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Low Ca-pyroxene $Fs_{62.2\pm2.2}Wo_{4.4\pm2.1}$, Fe/Mn=32±1, n=13; high-Ca pyroxene $Fs_{29.7\pm01.3}Wo_{42.4\pm0.7}$, Fe/Mn=31±1; n=8; plagioclase $Or_{0.6\pm0.1}Ab_{12.8\pm2.4}An_{86.7\pm2.5}$, n=4.
Classification: Achondrite (Eucrite-mmict). Monomict based on the presence of a single compositional population of highly equilibrated low-Ca and high-Ca pyroxenes.
Specimens: 19.3 g including a probe mount on deposit at *UNM*, *Aaronson* holds the main mass.

Northwest Africa 7904 (NWA 7904)

Morocco
Purchased: 2012
Classification: Primitive achondrite (Brachinite)
History: Purchased by Adam Aaronson in 2012.
Physical characteristics: Single stone, rough, oxidized, dark exterior. Broken surface reveals mosaic of shiny, fine-grained crystals.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished epoxy mount shows olivine 98%, low-Ca pyroxene 1%, opaques 1%, Fe-metal (oxidized) as films in grain boundaries and crosscutting veinlets. Olivine grain size up to 1 mm. Polygonal texture with numerous equilibrated triple junctions.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{30.0\pm0.7}$, Fe/Mn=61±4, n=7; low-Ca pyroxene $Fs_{24.2\pm0.2}Wo_{2.1\pm0.0}$, Fe/Mn=37±1, n=3. (Karen Ziegler, *UNM*) Oxygen isotope values of 4 acid-washed aliquots of bulk sample, 1.2, 1.8, 1.1, 1.4 mg, gave $\delta^{17}O$ = 2.210, 2.634, 2.694, 2.797, $\delta^{18}O$ = 4.781, 4.999, 5.166, 5.348, $\Delta^{17}O$ = -0.314, -0.005, -0.034, -0.027 (linearized, all permil).
Classification: Primitive achondrite (Brachinite), dunite, with heterogeneous oxygen isotopes, one value within the brachinite array and three values coinciding with the terrestrial fractionation line.
Specimens: 20.5 g including a probe mount on deposit at *UNM*, *Aaronson* holds the main mass.

Northwest Africa 7905 (NWA 7905)
Morocco
Purchased: 2004
Classification: Ordinary chondrite (L5)
History: Purchased on behalf of the University of Alberta Meteorite Collection from a Moroccan dealer by Stacey Gibb.
Physical characteristics: Complete, fusion-crusted individual with minor rust and caliche on the exterior.
Petrography: (P. Strickland, *UAb*). Petrographic microscope examination of thin section shows ~75 vol% chondrules, 20 vol% matrix, and 5 vol% metals/opaque minerals. Chondrules have an average diameter of 0.6 mm and display mostly radial pyroxene and porphyritic olivine-pyroxene textures. Interconnected shock-melt veins, irregular and planar fractures, mosaicism and undulatory extinction in olivine and pyroxene indicates moderate shock (S4).
Geochemistry: (C. Herd and P. Strickland, *UAb*). Olivine $Fa_{22.2\pm0.7}$ (n=24); Low-Ca Pyroxene $Fs_{19.8\pm1.2}Wo_{1.3\pm0.4}$ (n=32).
Classification: Ordinary chondrite (L5).
Specimens: Main mass, including polished thin section, are on deposit at *UAb*.

Northwest Africa 7906 (NWA 7906)
(Northwest Africa)
Purchased: Jan 2013
Classification: Martian meteorite (basaltic breccia)
History: Purchased in January 2013 by Marc Jost in Morocco.
Physical characteristics: Black 47.68 g stone with remnants of fusion crust. Light-colored clasts and spheroidal objects in a brecciated matrix.
Petrography: (B. Hofmann *NMBE*; N. Greber, *Bern*) Breccia of angular mineral grains (to 4 mm), lithic clasts and spheroidal objects (2-5 mm diameter) in fine-grained matrix. Minerals observed are pyroxenes, plagioclase,alkali feldspar, magnetite, chlorapatite, ilmenite, pyrite, maghemite, and goethite.
Geochemistry: Orthopyroxene ($Fs_{22-43}Wo_{2-4}$, FeO/MnO = 25-40; n = 15), pigeonite ($Fs_{30-50}Wo_{6-13}$, FeO/MnO = 30-42; n = 4), augite ($Fs_{31-51}Wo_{38-48}$, FeO/MnO = 22-42; n = 4), plagioclase ($An_{27-51}Or_{1.7-4.4}$; n = 15), alkali feldspar ($An_{1.1}Or_{87}$; n = 1). Bulk analysis (XRF, n=20) gives Fe/Mn (wt) = 45.7, Ca/Si = 0.23, Mg/Si = 0.21, Ni = 494 ppm, Cr = 1660 ppm. Oxygen isotopes: (R. Greenwood, *OU*) gave $\delta^{18}O$=6.28, $\delta^{17}O$=3.92, $\Delta^{17}O$= 0.62 (all per mil).
Classification: Martian (basaltic breccia). Closely resembles NWA 7034 and pairings and is very likely paired with these stones.

Specimens: 10.50 g and one polished thin section at *NMBE*. Remaining material is held by Marc Jost.

Northwest Africa 7907 (NWA 7907)
(Northwest Africa)
Purchased: Jan 2013
Classification: Martian meteorite (basaltic breccia)
History: Purchased in January 2013 by Marc Jost in Morocco
Physical characteristics: Black 29.94 g stone with remnants of fusion crust. Light-colored clasts and spheroidal objects in a brecciated matrix.
Petrography: (B. Hofmann *NMBE*; N. Greber, *Bern*) Breccia of angular mineral grains (to 4 mm), lithic clasts and spheroidal objects (2-5 mm diameter) in fine-grained matrix. Minerals observed are pyroxenes, plagioclase, alkali feldspar, magnetite, chlorapatite, ilmenite, pyrite, maghemite, and goethite.
Geochemistry: Orthopyroxene ($Fs_{21-55}Wo_{2-5}$, FeO/MnO = 26-55; n = 16), pigeonite ($Fs_{33-47}Wo_{7-18}$, FeO/MnO = 34-52; n = 6), augite ($Fs_{16-26}Wo_{37-45}$, FeO/MnO = 28-36; n = 3), plagioclase ($An_{29-52}Or_{1.6-4.5}$; n = 14), alkali feldspar ($An_{4.8}Or_{53}$; n = 1). Bulk analysis (XRF, n=21) shows Fe/Mn (wt) = 44.7, Ca/Si = 0.22, Mg/Si = 0.20, Ni = 550 ppm, Cr = 1680 ppm. Oxygen isotopes: (R. Greenwood, *OU*) gave $\delta^{18}O$ = 6.27, $\delta^{17}O$ = 3.89, $\Delta^{17}O$ = 0.60 (all per mil).
Classification: Martian (basaltic breccia). Closely resembles NWA 7034 and pairings and is very likely paired with these stones.
Specimens: 8.20 g and one polished thin section at *NMBE*. Remaining material is held by Marc Jost.

Northwest Africa 7908 (NWA 7908)
(Northwest Africa)
Purchased: Feb 2004
Classification: HED achondrite (Diogenite)
History: A pre-cut specimen was purchased from a Moroccan trader by Edwin Thompson, and a portion was donated to *Cascadia*, in February, 2004.
Physical characteristics: A cut slab shows grey clasts ranging from <1 mm to 1.5 cm set in a light-brown matrix. Black clasts are also present. Rust halos surround sparse metal grains in the matrix. The surface of the sample is rough, light brown to grey to black, and mostly lacks fusion crust.
Petrography: (A. Ruzicka, *Cascadia*) In thin section the meteorite consists almost entirely of low-Ca pyroxene and chromite. Coarse-grained (1-2 mm) orthopyroxenite (gray) and chromite (black) clasts are set in a matrix of smaller pyroxene and chromite clasts. Grains are highly fractured and pyroxene shows undulose to mosaic extinction. One metal grain is partly replaced by weathering product.
Geochemistry: Phase compositions are highly equilibrated: low-Ca pyroxene $Wo_{1.6\pm0.1}\,Fs_{25.1\pm0.8}$ Fe/Mn =26.5±2.7 (N=37), chromite Cr/(Cr=Al) = 0.83± 0.01 Fe/(Fe+Mg)= 0.78± 0.02 (N=14) (atomic units).
Classification: Achondrite (diogenite). Textures and mineralogy suggest a monomict orthopyroxenitic breccia. Minor weathering.
Specimens: 27.0 g, one polished thin section, and one butt are on deposit at *Cascadia*. *Thompson* holds the main mass.

Northwest Africa 7909 (NWA 7909)
(Northwest Africa)
Purchased: 2004
Classification: Mesosiderite (group C2)
History: The sample was purchased from a Moroccan trader by Mr. Thompson, and a portion was donated to *Cascadia* on May 3, 2004.
Physical characteristics: The hand specimen has faceted dark surfaces and brownish, broken faces; cut faces show rust splotches.
Petrography: (A.Ruzicka and K. Farley, *Cascadia*) Thin-section examination shows a silicate-metal breccia with ~15-20% metal, ~2-5% troilite, and lightly deformed low-Ca pyroxene present in both

mineral and lithic clasts, set in a granoblastic groundmass of pyroxene and subordinate plagioclase. Low-Ca pyroxene often contains exsolution lamellae or blebs of high-Ca pyroxene. Metal is <20% altered (grade W1).
Geochemistry: Phase compositions are relatively equilibrated: low-Ca pyroxene $Wo_{2.7\pm0.5}Fs_{23.7\pm1.1}$ Fe/Mn =26.7±4.1 (N=32), plagioclase $An_{90.8\pm1.8}Or_{0.04\pm0.3}$ (N=14) (atomic units).
Classification: Stony-iron (mesosiderite). Textures and mineralogy suggest a relatively uncommon group C mesosiderite (dominated by low-Ca pyroxene) of textural type 2.
Specimens: 33.3 g and one polished thin section at *Cascadia*. *Thompson* holds the main mass.

Northwest Africa 7910 (NWA 7910)
(Northwest Africa)
Purchased: Sept 2009
Classification: Mesosiderite (group B2)
History: A portion of the original sample was donated by Mr. Fred Olsen to *Cascadia* on June 29, 2010.
Physical characteristics: The fully crusted individual is oriented with a relatively flat leading side and some radial flow lines. No rusting is evident in cut faces.
Petrography: (A. Ruzicka and K. Farley, *Cascadia*) Thin-section examination shows a silicate-metal breccia with ~45-50% metal, ~10-15% troilite, and minor to moderately deformed mineral and lithic clasts dominated by low-Ca pyroxene and plagioclase set in a granoblastic matrix of pyroxene, plagioclase, and silica mineral. The largest lithic clast is a ~1-cm-diameter gabbro clast with low-Ca pyroxene, high-Ca pyroxene, plagioclase, and silica mineral. Metal is minimally weathered (grade W1).
Geochemistry: (K. Farley and A. Ruzicka, *Cascadia*) Phase compositions vary somewhat between and within clasts: low-Ca pyroxene $Wo_{3.9\pm0.7}Fs_{34.7\pm3.1}$ Fe/Mn =23.7±7.5 (N=297), plagioclase $An_{92.8\pm2.7}Or_{0.5\pm0.8}$ (N=238) (atomic units). Pyroxene clasts, and grains within the gabbro clast, sometimes have FeO-poor rims.
Classification: Stony-iron (mesosiderite). Textures and mineralogy suggest a group B mesosiderite of textural type 2, but the meteorite is unusually rich in troilite.
Specimens: 20.6 g in two slices and a polished thin section are on deposit at *Cascadia*. Mr. Ronnie McKenzie holds the main mass.

Northwest Africa 7912 (NWA 7912)
Morocco
Purchased: 2013
Classification: HED achondrite (Diogenite)
History: Purchased by Adam Bates from a Moroccan meteorite dealer, 2013.
Physical characteristics: Twelve pieces, the largest 12.8 g, brown weathered exterior. Saw cuts reveals light-brown crystalline texture.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows approximately 98% pyroxene plus accessory oxidized iron, low-Ni iron metal, chromite, and troilite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Low-Ca pyroxene $Fs_{30.7\pm0.7}Wo_{1.6\pm0.0}$, Fe/Mn=27±1, n=6.
Classification: HED Achondrite (diogenite), equilibrated low-Ca pyroxene.
Specimens: 11.5 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7913 (NWA 7913)
Morocco
Purchased: 2013
Classification: HED achondrite (Eucrite, cumulate)
History: Purchased by Adam Bates from a Moroccan meteorite dealer in 2013.
Physical characteristics: Single stone, brown weathered exterior, saw cut reveals dark-gray crystalline texture.

Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows grains (50 to 200 μm) of equilibrated pyroxene and plagioclase with numerous triple junctions, most pyroxene shows exsolution lamellae. Ubiquitous silica, chromite, and troilite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Low Ca-pyroxene $Fs_{41.4\pm4.2}Wo_{7.0\pm6.7}$, Fe/Mn=27±1, n=17; augite $Fs_{19.4\pm0.6}$, Fe/Mn=23±2, n=4; plagioclase $An_{94.7\pm0.3}$, n=7.
Classification: HED Achondrite (Eucrite, cumulate), equilibrated Mg-rich eucrite, low-Ca pyroxenes show Ca-enrichment trend.
Specimens: 19 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7914 (NWA 7914)
Morocco
Purchased: 2013
Classification: HED achondrite (Eucrite, monomict)
History: Purchased by Adam Bates from a Moroccan meteorite dealer in 2013.
Physical characteristics: Single stone, black fusion crust, saw cut reveals brecciated texture with pyroxene- and plagioclase-rich clasts, most 1-3 mm, but also scattered cm-sized clasts, set in gray groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows domains with abundant mesostasis, quench crystals, and zoned pyroxene phenocrysts, while other domains are composed of clastic or brecciated textures with ~1 mm plagioclase and pyroxenes. Ubiquitous silica, chromite, ilmenite, and low-Ni iron metal.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) EMPA. Low Ca-pyroxene $Fs_{45.7\pm5.3}Wo_{2.6\pm0.5}$, Fe/Mn=34±1, n=19; augite $Fs_{19.1}Wo_{42.5}$, Fe/Mn=30; plagioclase $An_{91.6\pm1.0}$, n=3.
Classification: Achondrite (eucrite, monomict), unequilbrated eucrite, low-Ca pyroxenes show Fe-enrichment trend.
Specimens: 20.5 g including a probe mount on deposit at *UNM*, Adam Bates holds the main mass.

Northwest Africa 7915 (NWA 7915)
Morocco
Purchased: 2010
Classification: Ordinary chondrite (LL5)
History: Purchased by T. Jakubowski from Moroccan dealer in Erfoud; 69 g was cut off and studied by M. Brawata as part of an MSc project supervised by R. Kryza.
Physical characteristics: Single stone (415 g) covered by black fusion crust with rollover lips preserved at one side.
Petrography: Chondrule types include PO, BO, RP, CC, GOP; mostly well-defined. Chondrule diameters 0.4 to 4.0 mm, average 0.96 mm. Opaque minerals (15 vol %) include troilite, taenite and rare chromite. Kamacite replaced by iron hydroxide. Taenite grains slightly weathered. Small feldspar grains discernable in electron image; accessory apatite. Rare planar fractures in olivine and pyroxene; undulatory extinction of pyroxene in radial-pyroxene chondrules.
Geochemistry: (R. Kryza, M.Brawata and J. Ćwiąkalski, *WrocU*): Olivine $Fa_{29.1}$, pyroxene $Fs_{24.1}Wo_{2.0}$, feldspar $An_{24.7}Ab_{71.9}Or_{3.5}$, chromite $(Mg_{0.1}Fe^{2+}_{0.96}Mn_{0.01}Zn_{0.01}Si_{0.02}Ti_{0.1})$ $(Al^{0.23}, Fe^{3+}_{0.02}Cr_{1.52})O_4$ and taenite with 25.50 wt% Ni and Co 1.67 wt%.
Classification: Ordinary chondrite LL5 S2 W3
Specimens: Main mass is held by T. Jakubowski. 42 g and three thin sections at *WrocU*.

Northwest Africa 7916 (NWA 7916)
(Northwest Africa)
Purchased: Nov 2010
Classification: Carbonaceous chondrite (CO3)

Physical characteristics: Single dark stone lacking fusion crust. Polished slices are jet black with few features visible to the naked eye.
Petrography: (L. Garvie, *ASU*) Abundant chondrules (~50 areal%), predominantly Type I, in a dark matrix. Chondrules to 1.5 mm, though most <200 μm. PO, POP chondrules dominate. Rare BO, RP, and C. One 1.6 × 1.1 mm AOA. CAIs common, to 1.1 mm. Matrix contains abundant micrometer-sized specks of metal and sulfide with very little alteration.
Geochemistry: (L. Garvie, *ASU*) Type I chondrules $Fa_{2.5\pm3.4}$, range 0.3-35.1, n=14. Type II chondrules, some strongly zoned, $Fa_{44.8\pm22.5}$, range $Fa_{13.3\text{-}80.0}$, n=8. Low Ca pyroxene $Fs_{2.6\pm1.9}Wo_{2.9\pm0.7}$, n=4.
Specimens: 61.1 g at *ASU*

Northwest Africa 7917 (NWA 7917)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (H3.4)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, dark irregular exterior, saw-cut reveals many densely packed chondrules of variable size, abundant fine-grained metal/sulfides.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous POP chondrules, metal is <25% oxidized.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Olivine range $Fa_{0.9\text{-}27.3}$, n=38, mean value ferroan olivine $Fa_{19.2\pm7.9}$, Fe/Mn=49±13, Cr_2O_3=0.13±0.16 wt%, range Cr_2O_3=0.01-0.50 wt%, n=37; low-Ca pyroxene range $Fs_{2.5\text{-}21.8}$, mean value $Fs_{12.4\pm7.2}Wo_{0.8\pm0.8}$, Fe/Mn=24±10, n=29.
Classification: Ordinary chondrite (H3.4), type 3.4 based on ferroan olivine mean Fs and sigma, weathering grade W2.
Specimens: 21 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7918 (NWA 7918)
Morocco
Purchased: 2012
Classification: Rumuruti chondrite (R3)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, dark brown fusion crust, with polygonal cracks, saw-cut reveals numerous chondrules of various sizes, some up to 2 mm, set in an orange-brown groundmass, tiny scattered reflective opaques.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous chondrules, some irregularly shaped, some with abundant plagioclase, breccia clasts also present. Fe-oxide, Ni-rich sulfide, troilite, and a single Ti-bearing sulfide detected.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{38.7\pm2.2}$, Fe/Mn=81±5, NiO=0.06±0.03 wt%, n=27; low-Ca pyroxene $Fs_{26.1\pm6.1}Wo_{1.1\pm0.9}$, Fe/Mn=61±22, n=13; high-Ca pyroxene $Fs_{12.8\pm3.6}Wo_{39.6\pm8.2}$, Fe/Mn=43±10, n=2; plagioclase $Ab_{87\pm1}$, n=2.
Classification: Rumuruti chondrite (R3.9), petrologic type based on the coefficient of variation (CV=6%) of chondrule olivine mean fayalite content.
Specimens: 20 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7919 (NWA 7919)
Morocco
Purchased: 2012
Classification: HED achondrite (Diogenite)

History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, partially fusion crusted, broken surface shows predominantly ~1 mm green pyroxene crystals.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows ~95% pyroxene, ~5% olivine, ubiquitous fine-grained chromite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{26.6\pm0.8}$, Fe/Mn=42±1, n=2; low-Ca pyroxene $Fs_{25.9\pm1.0}Wo_{3.4\pm0.6}$, Fe/Mn=28±1, n=10; chromite Cr/(Cr+Al)=0.66.
Classification: HED achondrite (Diogenite)
Specimens: 8.9 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7920 (NWA 7920)
Morocco
Purchased: 2012
Classification: Pallasite (Main group)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Dark brown irregular exterior, saw cut reveals rounded olivine grains, many 3-5 mm, also up to cm-size, set in a brown oxidized matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows olivine surrounded and penetrated by a matrix of iron oxides or hydroxides. No primary Fe-Ni metal detected.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{13.2\pm0.9}$, Fe/Mn=45±3, n=5.
Classification: Pallasite, main group.
Specimens: 26.1 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7921 (NWA 7921)
Morocco
Purchased: 2012
Classification: Carbonaceous chondrite (CV3)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Consists of 14 individual stones or fragments, several fit together. Dark irregular exterior, some weathered fusion crust, chondrules visible through desert patina, saw-cut reveals densely packed chondrules of variable size, many 1-2 mm, CAIs present.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount showed a sharp boundary between a large CAI and host matrix + chondrules. Matrix is very fine-grained with numerous porphyritic chondrules, accessory augite, diopside, aluminous diopside, and anorthite. Large CAI is approximately 95% gehlenite, with accessory spinel, hercynite-spinel, CaTiO3-perovskite, calcium carbonate, and Fe,Ni-metal.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine range $Fa_{0.7\text{-}12.4}$, n=31, mean value ferroan olivine $Fa_{5.3\pm2.7}$, Fe/Mn=53±28, Cr_2O_3=0.09±0.07wt%, n=22; type I chondrule olivine $Fa_{1.2\pm0.3}$, n=9; low-Ca pyroxene range $Fs_{0.8\text{-}15.1}$, mean value $Fs_{2.6\pm3.1}Wo_{1.4\pm1.0}$, Fe/Mn=16±10, n=22. (Karen Ziegler, *UNM*) Oxygen isotope mean values of 3 analyses on 3 acid-washed aliquots of matrix + chondrules, 1.1, 1.1, 1.7 mg, gave $\delta^{17}O$= -4.671, -3.451, -5.223, $\delta^{18}O$= -0.661, +0.453, -0.306, $\Delta^{17}O$= -4.322, -3.690, -5.061 (all per mil).
Classification: Carbonceous chondrite (CV3), oxygen isotopes on CCAM, in CV3 field.
Specimens: 21.4 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7922 (NWA 7922)
Morocco
Purchased: 2012

Classification: Ordinary chondrite (H6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, dark brown exterior, some weathered fusion crust, saw cut reveals many small chondrules and abundant metal grains set in an orange-brown groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous distinct POP chondrules, ~25% of metal is oxidized, some weathering veins.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{18.5\pm0.3}$, Fe/Mn=38±2, n=10; low-Ca pyroxene $Fs_{16.4\pm0.3}Wo_{0.9\pm0.4}$, Fe/Mn=23±2, n=10.
Classification: Ordinary chondrite (H6), weathering grade W2.
Specimens: 19 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7923 (NWA 7923)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (LL6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, black fusion crust, saw cut reveals a breccia with cm-sized dark clasts and light-colored matrix, very fine grained.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a few indistinct chondrules, plagioclase up to 100 μm, ubiquitous high-Ca pyroxene, chromite, and troilite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{32.5\pm0.3}$, Fe/Mn=65±2, n=7; low-Ca pyroxene $Fs_{26.4\pm0.2}Wo_{2.0\pm0.3}$, Fe/Mn=41±3, n=5.
Classification: Ordinary chondrite (LL6), weathering grade W1.
Specimens: 11.1 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7924 (NWA 7924)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (H6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, black weathered fusion crust, brown exterior, saw cut reveals many small chondrules and abundant fine metal grains, but some metal up to 2 mm, set in a gray groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous distinct POP chondrules, ~25% of metal is oxidized, some weathering veins.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{19.2\pm0.3}$, Fe/Mn=39±1, n=11; low-Ca pyroxene $Fs_{16.8\pm0.3}Wo_{1.5\pm1.3}$, Fe/Mn=24±1, n=11.
Classification: Ordinary chondrite (H6), weathering grade W2.
Specimens: 28.3 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7925 (NWA 7925)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (H4)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, dark irregular oxidized exterior, saw-cut reveals many densely packed chondrules of variable size, fine-grained metal, some areas with completely oxidized metal.

Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous POP chondrules, a few with mesostasis, metal is significantly oxidized, some carbonate detected.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{21.7\pm0.6}$, Fe/Mn=43±2, n=31; low-Ca pyroxene $Fs_{16.7\pm1.2}Wo_{1.2\pm1.8}$, Fe/Mn=25±5, n=29.
Classification: Ordinary chondrite (H4), weathering grade W3.
Specimens: 20.7 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7926 (NWA 7926)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (LL6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, weathered fusion crust, saw cut reveals a fine-grained texture, scattered metal/sulfide grains, set in a gray groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a few indistinct chondrules, plagioclase up to 100 μm, high-Ca pyroxene detected.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{30.8\pm0.7}$, Fe/Mn=61±3, n=7; low-Ca pyroxene $Fs_{24.6\pm0.1}Wo_{2.0\pm0.1}$, Fe/Mn=37±1, n=6.
Classification: Ordinary chondrite (LL6), weathering grade W1.
Specimens: 23.9 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7927 (NWA 7927)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (LL6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, fusion crusted, saw cut reveals breccia with cm-sized clasts set in an orange-brown groundmass, scattered fine-grained metal/sulfide.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous texturally equilibrated chondritric clasts set in a fine-grained, to cataclastic, matrix, some metal is oxidized, oxidized weathering veins present, indistinct or relict chondrules, plagioclase up to 100 μm.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{29.8\pm0.6}$, Fe/Mn=58±2, n=7; low-Ca pyroxene $Fs_{24.4\pm0.2}Wo_{2.0\pm0.1}$, Fe/Mn=35±1, n=7.
Classification: Ordinary chondrite (LL6), weathering grade W2.
Specimens: 47.2 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7928 (NWA 7928)
Morocco
Purchased: 2012
Classification: Ordinary chondrite (L5)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, dark brown, oxidized fusion crust, saw cut reveals breccia with clasts up to 10s of cm, many dark melt veins.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows an equilibrated chondrite texture, scarce indistinct chondrules, melt pockets, apatite (Cl-rich), chromite, FeNi metal, troilite, up to ~50% of metal is oxidized, some weathering veins.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{26.0\pm1.0}$, Fe/Mn=52±5, n=6; low-Ca pyroxene $Fs_{22.1\pm1.0}Wo_{1.7\pm0.1}$, Fe/Mn=31±2, n=6; plagioclase $Ab_{84\pm2}$, n=3.

Classification: Ordinary chondrite (L5), weathering grade W2.
Specimens: 18.9 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7931 (NWA 7931)
(Northwest Africa)
Purchased: 2013 May
Classification: Lunar meteorite (feldspathic breccia)
History: Purchased by Alexandre Debienne in May 2013 from a dealer in Agadir, Morocco.
Physical characteristics: A single small stone (5.92 g) lacking fusion crust.
Petrography: (A. Irving and S. Kuehner, *UWS*) Breccia consisting of numerous small mineral clasts in partly glassy, vesicular matrix. Minerals are anorthite, olivine, fayalite, pigeonite, ilmenite (with rare baddeleyite inclusions), Ti-rich chromite, troilite and minor kamacite.
Geochemistry: Olivine ($Fa_{44.3\text{-}50.2}$; FeO/MnO = 85-96), orthopyroxene ($Fs_{28.6}Wo_{1.8}$; FeO/MnO = 60), pigeonite ($Fs_{29.8\text{-}41.1}Wo_{11.3\text{-}6.6}$; FeO/MnO = 52-62), ferroan subcalcic augite ($Fs_{54.4}Wo_{36.4}$; FeO/MnO = 63). Bulk composition (R. Korotev, *WUSL*): INAA of subsamples gave mean abundances of FeO 7.5 wt.%, and (in ppm) Sc 18, La 3.9, Sm 1.9, Eu 0.74, Yb 1.6, Th 0.6.
Classification: Lunar (feldspathic regolithic breccia).
Specimens: 1.2 g of material is at *PSF*. The remaining material is with *ADebienne*

Northwest Africa 7932 (NWA 7932)
Morocco
Purchased: 2013
Classification: Carbonaceous chondrite (CV3)
History: Purchased by Abdelfattah Gharrad, Abdellah Afiniss, and Adam Bates in Morocco, 2013.
Physical characteristics: Single stone, dark-gray exterior, sawn surface shows small scattered chondrules and CAIs set in dark-gray matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows dominant (~75% volume) fine-grained matrix, sparse PO and POP chondrules, most 200-500 μm, irregularly shaped chondrules common.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine range $Fa_{0.8\text{-}38.6}$, n=43, ferroan olivine $Fa_{13.4\pm10.9}$, Fe/Mn=99±55, n=37; aluminous high-Ca pyroxene, range $Fs_{0.2\text{-}16.2}$, range Al_2O_3 1.43-17.53 wt%, n=9; low-Ca pyroxene range $Fs_{1.2\text{-}24.1}$ n=4; plagioclase $An_{81.2}$, n=1. (Karen Ziegler, *UNM*) Oxygen isotope mean values of 2 analyses on 2 acid-washed bulk samples, 1.6 and 1.7 mg, gave $\delta^{17}O$= -4.825, -5.155, $\delta^{18}O$= -1.283, -1.260, $\Delta^{17}O$= -4.148, -4.490 (linearized, all per mil).
Classification: Carbonaceous chondrite (CV3), oxygen isotopes on CCAM, in CV3 field.
Specimens: 20.5 g including a probe mount on deposit at *UNM*, Abdelfattah Gharrad, Abdellah Afiniss, and Adam Bates hold the main mass.

Northwest Africa 7935 (NWA 7935)
(Northwest Africa)
Purchased: 2013 April
Classification: Ordinary chondrite (LL5)
History: Purchased by B. Li in Tucson in April 2013.
Physical characteristics: (R. Bartoschewitz, *Bart*, and B. Li) Meteorite fragment, surface party covered by fusion crust, saw-cut surface shows dark gray clast, chondrules and metal specks, set in a brown-colored matrix. Magnetic susceptibility log χ =3.52.
Petrography: Microprobe examination of a polished thin section shows moderately well developed chondrules (dominantly porphyritic) up to 1.5 mm (mean 0.5 mm), chondrule and mineral fragments in recrystallized matrix with few metal grains.

Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Olivine: $Fa_{30.0\text{-}31.2}$, mean $Fa_{30.5\pm0.35}$ (n=16); low Ca pyroxene: $Fs_{24.4\text{-}26.3}$, mean $Fs_{25.0\pm0.61}$ (n=9), $Wo_{1.4\text{-}2.0}$, mean $Wo_{1.7\pm0.20}$; diopside $Fs_9En_{45}Wo_{46}$ (n=1); feldspar $An_{10}Or_4$ (n=1); Chromite CRAL=FFM=88 (n=1); taenite: Ni=37.3, Co=1.7 wt.% (n=1).
Classification: ordinary chondrite (LL5)
Specimens: 10.1 g on deposit at *Kiel*, B. Li holds the main mass and 11.9 g with *Bart*.

Northwest Africa 7936 (NWA 7936)
(Northwest Africa)
Purchased: 2012
Classification: Ordinary chondrite (L3)
History: Purchased by Ali and Mohammed Hmani in 2012 from a dealer in Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Medium to large (0.4-2.3 mm), well-formed chondrules. Olivine, orthopyroxene, pigeonite, augite, sodic plagioclase, chromite, stained kamacite and troilite.
Geochemistry: Olivine ($Fa_{1.4\text{-}76.8}$; Cr_2O_3 in ferroan examples is 0.06-0.83 wt.%, mean 0.23±0.22 wt.%, N = 14), orthopyroxene ($Fs_{1.0\text{-}43.8}Wo_{0.9\text{-}2.8}$), pigeonite ($Fs_{18.2}Wo_{22.1}$), augite ($Fs_{8.5}Wo_{41.9}$).
Classification: Ordinary chondrite (L3.15). Estimation of subtype based Cr_2O_3 distribution in ferroan olivine per Fig. 15a of Grossman and Brearley (2005).
Specimens: 20.1 g and one polished thin section are at *UWB*. The remainder is held by *Hmani*.

Northwest Africa 7937 (NWA 7937)
(Northwest Africa)
Purchased: 2013
Classification: Martian meteorite (Shergottite)
History: Purchased by Ali and Mohammed Hmani in 2013 in Guelmim, Morocco.
Physical characteristics: Several small stones lacking fusion crust (total 152.9 g).
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively fresh specimen with poikilitic to subequigranular texture consisting of zoned clinopyroxene, in places enclosing chadacrysts of olivine, along with intermediate plagioclase (completely converted to maskelynite), Cr-rich chromite, Ti-rich chromite, ilmenite, Ni-bearing pyrrhotite, merrillite and minor chlorapatite.
Geochemistry: Olivine ($Fa_{36.7\text{-}39.4}$; FeO/MnO = 46-51), pigeonite ($Fs_{27.7\text{-}29.7}Wo_{16.3\text{-}10.0}$; FeO/MnO = 26-31), subcalcic augite ($Fs_{19.7}Wo_{26.9}$; FeO/MnO = 27).
Classification: Martian (shergottite, poikilitic). This specimen is very likely paired with NWA 7397, NWA 7387 and NWA 7755.
Specimens: 21.1 g and one polished thin section are at *UWB*. The remainder is held by *Hmani*.

Northwest Africa 7938 (NWA 7938)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ordinary chondrite (H3)
History: Purchased by Gary Fujihara in February 2013 from a dealer in Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, small to medium-sized (0.4-1 mm, some up to 1.8 mm), closely-packed chondrules in a sparse matrix relatively rich in altered metal. Olivine, orthopyroxene, subcalcic augite, augite, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{0.5\text{-}61.2}$; Cr_2O_3 in ferroan examples is 0.09-0.75 wt.%, mean 0.21±0.20 wt.%, N = 12), orthopyroxene ($Fs_{0.8\text{-}16.8}Wo_{0.7\text{-}1.4}$), subcalcic augite ($Fs_{31.6}Wo_{36.9}$), augite ($Fs_{9.0}Wo_{45.2}$).
Classification: Ordinary chondrite (H3.15). Estimation of subtype based Cr_2O_3 distribution in ferroan olivine per Fig. 15a of Grossman and Brearley (2005).
Specimens: 11.3 g and one polished thin section are at *UWB*. The remainder is held by Mr. G. Fujihara.

Northwest Africa 7939 (NWA 7939)
(Northwest Africa)

Purchased: 2013 Feb
Classification: Ordinary chondrite (LL4-6)
History: Purchased by Gary Fujihara in February 2013 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively fresh breccia composed of closely-packed clasts (exhibiting variable degree of recrystallization) plus some large, well-formed chondrules in a sparse fragmental matrix containing stained metal grains. Chondrule abundances in clasts range from sparse to rare. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{31.5-31.8}$), orthopyroxene ($Fs_{22.3-24.4}Wo_{0.7-1.6}$), clinopyroxene ($Fs_{8.9-9.1}Wo_{44.6-43.9}$).
Classification: Ordinary chondrite (LL4-6).
Specimens: 20.9 g and one polished thin section are at *UWB*. The remainder is held by Mr. G. Fujihara.

Northwest Africa 7940 (NWA 7940)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ordinary chondrite (L3)
History: Purchased by Gary Fujihara in February 2013 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, closely-packed, medium-sized (0.4-2.2 mm) chondrules. Olivine, orthopyroxene, subcalcic augite, augite, sodic plagioclase, chromite, stained kamacite and troilite.
Geochemistry: Olivine ($Fa_{0.7-60.0}$; Cr_2O_3 in ferroan examples is 0.04-0.63 wt.%, mean 0.21±0.20 wt.%, N = 11), orthopyroxene ($Fs_{1.0-22.1}Wo_{0.7-0.4}$), subcalcic augite ($Fs_{3.4}Wo_{35.9}$), augite ($Fs_{10.4}Wo_{41.5}$).
Classification: Ordinary chondrite (L3.15). Estimation of subtype based Cr_2O_3 distribution in ferroan olivine per Fig. 15a of Grossman and Brearley (2005).
Specimens: 20.7 g and one polished thin section are at *UWB*. The remainder is held by Mr. G. Fujihara.

Northwest Africa 7941 (NWA 7941)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ordinary chondrite (L3)
History: Purchased by Gary Fujihara in February 2013 from a dealer in Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, closely-packed, small to large (0.2-3.5 mm) chondrules. Olivine, orthopyroxene, pigeonite, subcalcic augite, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{2.3-48.0}$; Cr_2O_3 in ferroan examples is 0.06-0.19 wt.%, mean 0.11±0.06 wt.%, N = 7), orthopyroxene ($Fs_{2.6-22.1}Wo_{0.4-1.2}$), pigeonite ($Fs_{24.6}Wo_{10.2}$), subcalcic augite ($Fs_{17.7}Wo_{31.6}$).
Classification: Ordinary chondrite (L3.4). Estimation of subtype based on histograms of Cr_2O_3 distribution in ferroan olivine given in Fig. 4 of Grossman and Brearley (2005).
Specimens: 20.9 g and one polished thin section are at *UWB*. The remainder is held by Mr. G. Fujihara.

Northwest Africa 7942 (NWA 7942)
(Northwest Africa)
Purchased: 2012 Sep
Classification: Carbonaceous chondrite (CV3)
History: Purchased by Gary Fujihara from a Moroccan dealer in September 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fairly closely-packed, medium to large (0.8-2.8 mm), irregularly shaped, granular chondrules plus fairly large irregularly shaped CAI in a deep brown, fine-grained matrix. Olivine, orthopyroxene, pigeonite, Al-Ti-diopside in CAI with gehlenite, spinel and perovskite.

Geochemistry: Olivine ($Fa_{0.5\text{-}35.8}$, n = 3), orthopyroxene ($Fs_{0.5\text{-}3.1}Wo_{0.9\text{-}1.0}$), pigeonite ($Fs_{1.0}Wo_{14.4}$), Al-Ti-diopside in CAI ($Fs_{0.7}Wo_{53.1}$).
Classification: Carbonaceous chondrite (CV3).
Specimens: 20.1 g and one polished thin section are at *UWB*. The remainder is held by Mr. G. Fujihara.

Northwest Africa 7943 (NWA 7943)
(Northwest Africa)
Purchased: 2012 Feb
Classification: HED achondrite (Eucrite, polymict)
History: Purchased by Gary Fujihara in February 2012 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fragmental breccia dominated by angular shocked eucrite clasts and related mineral debris in a fairly coarse matrix. Extensive shock is manifested by conversion of plagioclase to spherulitic aggregates of fibrous, birefringent crystals. Moderate terrestrial weathering is indicated by the brown cores in some mafic silicates, stained opaque grains and minor barite in the matrix. Minerals are exsolved pigeonite, calcic plagioclase, ilmenite, Ti-bearing chromite, silica polymorph, sparse (~5 vol.%) diogenitic orthopyroxene, ferropigeonite and sparse olivine.
Geochemistry: Host low-Ca pyroxene ($Fs_{51.5}Wo_{5.6}$; FeO/MnO = 33), clinopyroxene lamellae ($Fs_{22.4}Wo_{41.4}$; FeO/MnO = 24), ferropigeonite ($Fs_{57.6}Wo_{7.4}$; FeO/MnO = 33), diogenitic orthopyroxene ($Fs_{30.0}Wo_{2.5}$; FeO/MnO = 28), olivine ($Fa_{15.6}$, FeO/MnO = 44; $Fa_{28.5}$, FeO/MnO = 50).
Classification: Eucrite breccia.
Specimens: 23 g and one polished thin section are at *UWB*. The remainder is held by Mr. G. Fujihara.

Northwest Africa 7944 (NWA 7944)
(Northwest Africa)
Purchased: 2013 Apr
Classification: Martian meteorite (Shergottite)
History: Purchased by Darryl Pitt in April 2013 from a dealer in Zagora, Morocco.
Physical characteristics: A single stone (815 g) lacking fusion crust.
Petrography: (A. Irving and S. Kuehner, *UWS*) Diabasic-textured assemblage of complexly-zoned clinopyroxene and lath-like maskelynite with accessory ulvöspinel, ilmenite, chlorapatite, merrillite, pyrrhotite and K-bearing glass. Marginal areas of some pyroxene grains consist of intergrowths of hedenbergite+fayalite+silica polymorph.
Geochemistry: Pigeonite ($Fs_{37.7\text{-}56.7}Wo_{11.7\text{-}20.9}$, FeO/MnO = 33-38, n = 4), subcalcic augite ($Fs_{26.7\text{-}39.1}Wo_{35.7\text{-}28.4}$; FeO/MnO = 31-34, n = 3), ferropigeonite ($Fs_{80.1\text{-}81.2}Wo_{13.1\text{-}12.9}$, FeO/MnO = 32-38, n = 2), plagioclase ($An_{40.1\text{-}49.6}Or_{3.3\text{-}1.1}$). Oxygen isotopes (D. Rumble, *CIW*): analyses of acid-washed silicate subsamples by laser fluorination gave, respectively: $\delta^{17}O$ = 2.819, 2.615; $\delta^{18}O$ = 4.892, 4.374; $\Delta^{17}O$ = 0.246, 0.314 (all per mil).
Classification: Martian (shergottite, diabasic).
Specimens: 20.5 g and one polished thin section are at *UWB*. The remainder is held by *DPitt*.

Northwest Africa 7945 (NWA 7945)
(Northwest Africa)
Purchased: 2013 Mar
Classification: Primitive achondrite (Lodranite)
History: Purchased in Temara, Morocco, by Adam Aaronson in December 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Medium grained (0.4-1.0 mm, mean 0.7 mm) protogranular aggregate of olivine, clinopyroxene, orthopyroxene, intermediate plagioclase, Cr-rich chromite, chlorapatite, altered kamacite, and troilite.
Geochemistry: Olivine ($Fa_{11.7\text{-}12.2}$; FeO/MnO = 22-23), orthopyroxene ($Fs_{11.3\text{-}11.4}Wo_{2.3\text{-}2.6}$; FeO/MnO = 14-15), clinopyroxene ($Fs_{4.8\text{-}5.0}Wo_{43.6\text{-}44.2}$; FeO/MnO = 9).

Classification: Lodranite.
Specimens: 20.1 g of material and one polished thin section are at *UWB*. The remaining material is held by *Aaronson*.

Northwest Africa 7946 (NWA 7946)
(Northwest Africa)
Purchased: 2013 May
Classification: Carbonaceous chondrite (CO3)
History: Purchased by Mohamed Aid in Ouarzazate, Morocc,o in May 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Composed of small (0.2-0.9 mm), well-formed chondrules plus sparse mineral fragments and fine grained, CAI occur in a fine-grained, deep-brown matrix.
Geochemistry: Olivine ($Fa_{0.2\text{-}85.8}$; Cr_2O_3 in ferroan examples is 0.16-0.31 wt.%, mean 0.23 wt.%, s.d. 0.07 wt.%, N = 8), orthopyroxene ($Fs_{1.2\text{-}2.0}Wo_{1.2\text{-}1.4}$), subcalcic augite ($Fs_{1.3\text{-}2.0}Wo_{38.4\text{-}36.3}$).
Classification: Carbonaceous chondrite (CO3.3). Estimation of subtype based on histograms of Cr_2O_3 content in ferroan olivine given by Grossman and Brearley (2005).
Specimens: 20.3 g and one polished thin section are at *UWB*. The remainder is held by M. Aid.

Northwest Africa 7947 (NWA 7947)
(Northwest Africa)
Purchased: 2013 May
Classification: HED achondrite (Diogenite)
History: Purchased in Temara, Morocco by Adam Aaronson in December 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh clast-rich breccia composed predominantly of angular grains of orthopyroxene with accessory olivine, chromite, and minor troilite.
Geochemistry: Orthopyroxene ($Fs_{23.3\text{-}23.5}Wo_{1.2\text{-}0.7}$; FeO/MnO = 28-31), olivine ($Fa_{29.5\text{-}29.7}$; FeO/MnO = 46-48).
Classification: Diogenite breccia.
Specimens: 21.2 g of material and one polished thin section are at *UWB*. The remaining material is held by *Aaronson*.

Northwest Africa 7948 (NWA 7948)
(Northwest Africa)
Purchased: 2013 Apr
Classification: Lunar meteorite (feldspathic breccia)
History: Purchased by Eric Twelker in April 2013 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh specimen composed of angular clasts (some lithic clasts up to 1.2 cm across, but mostly mineral fragments) in a finer grained, dark matrix. Minerals present are anorthite, olivine, pigeonite, subcalcic augite, Ti-chromite, troilite, rare silica polymorph and a shred-like grain of kamacite. A thin vesicular, glassy shock vein was found.
Geochemistry: Olivine ($Fa_{37.8\text{-}61.2}$; FeO/MnO = 90-107), pigeonite ($Fs_{27.1\text{-}28.1}Wo_{13.3\text{-}11.0}$; FeO/MnO = 56-58), subcalcic augite ($Fs_{17.1\text{-}22.3}Wo_{35.9\text{-}29.9}$; FeO/MnO = 41-53), ferroan subcalcic augite ($Fs_{44.0}Wo_{39.4}$; FeO/MnO = 74), anorthite ($An_{90.4\text{-}92.0}Or_{0.3\text{-}0.4}$). Bulk composition (R. Korotev, *WUSL*): INAA of subsamples gave mean abundances of FeO 8.8 wt.%, and (in ppm) Sc 16, La 6.5, Sm 3.1, Eu 0.92, Yb 2.2, Th 1.0.
Classification: Lunar (mingled regolithic breccia).
Specimens: 12.2 g are at *UWB*. The remainder is with *Twelker*.

Northwest Africa 7950 (NWA 7950)
(Northwest Africa)
Purchased: 2013 May

Classification: HED achondrite (Diogenite)
History: Purchased in Temara, Morocco by Adam Aaronson in December 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh clast-rich breccia dominated by angular grains of orthopyroxene (of several different compositions) with accessory olivine, chromite and minor troilite.
Geochemistry: Orthopyroxene ($Fs_{24.5}Wo_{1.5}$; $Fs_{25.9}Wo_{1.5}$; FeO/MnO = 24-26), olivine ($Fa_{29.8-30.3}$; FeO/MnO = 43-47).
Classification: Diogenite (polymict breccia). Composed of clasts and mineral debris from several different diogenite lithologies.
Specimens: 23 g of material and one polished thin section are at *UWB*. The remaining material is held by *Aaronson*.

Northwest Africa 7951 (NWA 7951)
(Northwest Africa)
Purchased: 2013 Apr
Classification: Ordinary chondrite (H6)
History: Purchased by Adam Aaronson in Temara, Morocco in April 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very sparse, small chondrules in a highly recrystallized matrix. Olivine, orthopyroxene, augite, sodic plagioclase, altered kamacite, chromite and troilite.
Geochemistry: Olivine ($Fa_{19.3-19.5}$), orthopyroxene ($Fs_{17.5-17.9}Wo_{0.9-1.1}$), augite ($Fs_{6.5-6.8}Wo_{44.8-45.5}$).
Classification: Ordinary chondrite (H6).
Specimens: 21.9 g and one polished thin section are at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 7952 (NWA 7952)
(Northwest Africa)
Purchased: 2013 May
Classification: HED achondrite (Diogenite, polymict)
History: Purchased in Temara, Morocco by Adam Aaronson in December 2012.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fairly fresh complex, clast-rich breccia composed predominantly (>90 vol.%) of angular grains of orthopyroxene with accessory olivine, pigeonite, more ferroan orthopyroxene, augite, calcic plagioclase, silica polymorph, Ti-chromite, ilmenite, stained metal and troilite.
Geochemistry: Orthopyroxene ($Fs_{23.7-24.0}Wo_{2.5-2.6}$; FeO/MnO = 27-31), ferroan orthopyroxene ($Fs_{48.3}Wo_{1.5}$; FeO/MnO = 35), olivine ($Fa_{33.2-33.5}$; FeO/MnO = 50-53), pigeonite ($Fs_{55.9}Wo_{21.7}$; FeO/MnO = 30), augite ($Fs_{49.6}Wo_{39.6}$; FeO/MnO = 35).
Classification: Diogenite (polymict breccia). Composed predominantly of diogenitic material with minor admixture of eucritic debris.
Specimens: 20.1 g of material and one polished thin section are at *UWB*. The remaining material is held by *Aaronson*.

Northwest Africa 7953 (NWA 7953)
(Northwest Africa)
Purchased: 2013 Jun
Classification: Carbonaceous chondrite (CK4)
History: Purchased by Adam Aaronson in Temara, Morocco, in May 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Exceptionally fresh, unequilibrated chondrite containing well-formed chondrules and dispersed grains of magnetite (some in chondrule rims). Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, Ti-Cr-bearing magnetite, pentlandite, Ni-bearing pyrrhotite, Ni-free pyrrhotite and chlorapatite.
Geochemistry: Olivine ($Fa_{27.2-36.5}$, n = 3; FeO/MnO = 67-85), orthopyroxene ($Fs_{26.4-27.6}Wo_{0.9-1.3}$), clinopyroxene ($Fs_{8.9-10.6}Wo_{46.5-46.1}$).
Classification: Carbonaceous chondrite (CK3).

Specimens: 10.2 g and one polished thin section are at *UWB*. The remainder is held by *GHupé*.

Northwest Africa 7954 (NWA 7954)
(Northwest Africa)
Purchased: 2013 Apr
Classification: HED achondrite (Eucrite, monomict)
History: Purchased by Steve Witt in April 2013 from a Moroccan dealer.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very fresh fragmental breccia composed mainly of angular crystal fragments of exsolved pigeonite and calcic plagioclase with accessory ilmenite, chromite and troilite. Additionally, there are sparse related basaltic eucrite clasts, plus some coarser mineral clasts derived from gabbroic eucrite protoliths.
Geochemistry: Host orthopyroxene ($Fs_{57.4\text{-}58.5}Wo_{1.8\text{-}1.9}$; FeO/MnO = 31-34), clinopyroxene exsolution lamellae ($Fs_{29.3}Wo_{36.3}$; FeO/MnO = 32).
Classification: Eucrite (monomict).
Specimens: 22.9 g and one polished thin section are at *UWB*. The remainder is held by Mr. S. Witt.

Northwest Africa 7955 (NWA 7955)
(Northwest Africa)
Purchased: 2013 Apr
Classification: HED achondrite (Diogenite, polymict)
History: Purchased by Steve Witt in April 2013 from a Moroccan dealer.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively fresh fragmental breccia composed predominantly of angular diogenitic orthopyroxene grains. Minor components (<5 vol.%) include basaltic eucrite clasts, coarse pigeonite and calcic plagioclase grains derived from gabbroic eucrites, chromite, ilmenite and troilite and rare angular grains of olivine.
Geochemistry: Diogenitic orthopyroxene ($Fs_{20.7}Wo_{0.8}$; FeO/MnO = 33), olivine ($Fa_{39.6}$, FeO/MnO =50; Fa_{47}, FeO/MnO = 52), host orthopyroxene ($Fs_{51.6}Wo_{3.1}$; FeO/MnO = 32), clinopyroxene exsolution lamellae ($Fs_{26.5\text{-}30.6}Wo_{39.7\text{-}40.8}$; FeO/MnO = 29-35).
Classification: Diogenite (polymict).
Specimens: 22.1 g and one polished thin section are at *UWB*. The remainder is held by Mr. S. Witt.

Northwest Africa 7956 (NWA 7956)
(Northwest Africa)
Purchased: 2013 Apr
Classification: Ordinary chondrite (LL6)
History: Puchased by Steve Witt in April 2013 from a Moroccan dealer.
Petrography: (A. Irving and S. Kuehner, *UWS*) Breccia composed of closely-packed, angular clasts which are highly recrystallized with poikiloblastic textures and only rare chondrule remnants. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, stained kamacite and troilite.
Geochemistry: Olivine ($Fa_{32.3\text{-}33.3}$), orthopyroxene ($Fs_{25.2\text{-}25.4}Wo_{2.3\text{-}2.1}$), clinopyroxene ($Fs_{10.9}Wo_{42.1}$)
Classification: Ordinary chondrite (LL6).
Specimens: 12.2 g and one polished thin section are at *UWB*. The remainder is held by Mr. S. Witt.

Northwest Africa 7957 (NWA 7957)
(Northwest Africa)
Purchased: 2013 Apr
Classification: Carbonaceous chondrite (CO3)
History: Purchased by Steve Witt from a Moroccan dealer in April 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Small (0.2-0.6 mm), well-formed chondrules plus sparse mineral fragments and fine grained CAI (some containing hibonite) in a brown matrix.

Geochemistry: Olivine ($Fa_{1.2-47.4}$; Cr_2O_3 in ferroan examples is 0.09-0.14 wt.%, mean 0.12 wt.%, s.d. 0.02 wt.%, N = 7), orthopyroxene ($Fs_{1.4-6.7}Wo_{3.5-3.3}$), subcalcic augite ($Fs_{1.1-1.4}Wo_{37.7-28.9}$).
Classification: Carbonaceous chondrite (CO3). Subtype is estimed to be 3.5 on the basis of the narrow distribution of Cr_2O_3 in ferroan olivine.
Specimens: 19.7 g and one polished thin section are at *UWB*. The remainder is held by Mr. S. Witt.

Northwest Africa 7958 (NWA 7958)
(Northwest Africa)
Purchased: 2013 Apr
Classification: HED achondrite (Eucrite)
History: Purchased by Steve Witt in April 2013 from a Moroccan dealer.
Petrography: (A. Irving and S. Kuehner, *UWS*) Unbrecciated but somewhat shocked specimen containing cross-cutting, thin, glassy veinlets. Intersertal assemblage of exsolved pigeonite, calcic plagioclase (exhibiting irregular, patchy birefringence), silica, ilmenite, troilite and tiny grains of zircon.
Geochemistry: Host orthopyroxene ($Fs_{61.8-61.9}Wo_{1.9-3.2}$; FeO/MnO = 32-33), clinopyroxene exsolution lamellae ($Fs_{26.0-26.3}Wo_{44.3}$; FeO/MnO = 30-31).
Classification: Eucrite (basaltic).
Specimens: 10.6 g and one polished thin section are at *UWB*. The remainder is held by Mr. S. Witt.

Northwest Africa 7959 (NWA 7959)
(Northwest Africa)
Purchased: 2013 Jun
Classification: Lunar meteorite (feldspathic breccia)
History: Purchased by Stefan Ralew in June 2013 from a Moroccan dealer at the Ensisheim Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Angular mineral clasts are set in a fine grained, vesicular glassy matrix. Minerals are olivine, orthopyroxene, pigeonite, augite, anorthite, ilmenite and small, ragged grains of kamacite. Small amounts of terrestrial calcite and barite are present.
Geochemistry: Olivine ($Fa_{14.7-35.9}$, FeO/MnO = 77-107), orthopyroxene ($Fs_{17.3}Wo_{2.5}$, FeO/MnO = 55), pigeonite ($Fs_{23.6-24.4}Wo_{9.9-11.4}$, FeO/MnO = 47-49), augite ($Fs_{13.2}Wo_{40.6}$, FeO/MnO = 36), anorthite ($An_{96.0-96.1}Or_{0.0}$). Bulk composition (R. Korotev, *WUSL*): INAA of subsamples gave mean abundances of FeO 3.3 wt.%, and (in ppm) Sc 19, La 2.6, Sm 1.2, Eu 0.78, Yb 0.8, Th 0.4.
Classification: Lunar (feldspathic regolithic breccia).
Specimens: 20.2 g are at *UWB*. The remainder is with *Ralew*.

Northwest Africa 7960 (NWA 7960)
Morocco
Purchased: 2013
Classification: HED achondrite (Eucrite, unbrecciated)
History: Purchased by A. *Hmani* in Dakla, Morocco, 2013.
Physical characteristics: Single stone, light brown-green weathered fusion crust or desert patina, broken surface reveals fresh unbrecciated texture with millimeter-sized green pyroxenes and white plagioclase crystals.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows approximately equal amounts of pyroxene and plagioclase, crystal size in the range 200-1000 μm. Ubiquitous silica, chromite, and troilite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Pigeonite $Fs_{47.7\pm1.8}Wo_{7.9\pm2.1}$, Fe/Mn=32±1, n=19; augite $Fs_{29.3\pm0.9}Wo_{34.2\pm0.4}$, Fe/Mn=30±2, n=2; plagioclase $An_{90.7\pm0.5}$, n=4.
Classification: Achondrite (equilibrated, unbrecciated eucrite), Mg# is transitional between cumulate eucrites and ordinary or basaltic eucrites.
Specimens: 22.7 g including a probe mount on deposit at *UNM*. M. Hmani holds the main mass.

Northwest Africa 7961 (NWA 7961)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (LL5)
History: Purchased by Jengemjs Sahanov at the Tucson Gem and Mineral Show in 2013.
Physical characteristics: Single stone, black fusion with some polygonal cracks, saw cut reveals very fine-grained light orange-brown groundmass, tiny scattered opaques.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a few equilibrated chondrules, abundant plagioclase, accessory chromite and Cl-rich apatite.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{33.2\pm1.7}$, Fe/Mn=66±4, n=13; low-Ca pyroxene $Fs_{27.0\pm1.3}Wo_{3.1\pm0.2}$, Fe/Mn=41±2, n=12; plagioclase $Ab_{84.0\pm1.6}An_{10.1\pm0.1}Or_{5.8\pm1.6}$, n=4.
Classification: Ordinary chondrite (LL5), weathering grade W1.
Specimens: 21.8 g including a probe mount on deposit at *UNM*, Jengemjs Sahanov holds the main mass.

Northwest Africa 7962 (NWA 7962)
(Northwest Africa)
Found: Jan 2011
Classification: Ordinary chondrite (H5)
History: One crusted stone weighing 110.3 g was found and purchased in Agadir in 2013. Greg Catterton acquired the sample from a meteorite prospector in 2013.
Physical characteristics: Dark brown fusion crust fusion crust covers 99% of the flattened, ellipsoidal stone.
Petrography: (A. Love, *App*): Sample is mottled light orange to blackish brown in color and displays a chondritic texture composed of well-defined chondrules (mean diameter 534 μm) and fragments set within a fine-grained recrystallized matrix with interstitial metal grains to 277 μm and sulfides to 208 μm.
Geochemistry: (A.Love, *App*) $Fa_{18.6\pm0.3}$, n=19, Low-Ca pyroxene $Fs_{16.0\pm0.2}Wo_{1.6\pm0.6}$, n=8, $An_{39.1}$ n=1.
Classification: Ordinary chondrite (H5, S3, W2)
Specimens: 20.85 g and 1 polished thin section are on deposit at *App*.

Northwest Africa 7963 (NWA 7963)
(Northwest Africa)
Purchased: 2013
Classification: Ordinary chondrite (LL5)
History: A single crusted stone weighing 457.7 g was found and purchased in Agadir in 2013. Greg Catterton acquired the sample from a meteorite prospector in 2013.
Physical characteristics: Dark brown fusion crust fusion crust covers -65% of the rounded ellipsoidal stone. A few shallow regmaglypts are visible on the crusted surface.
Petrography: (A. Love, *App*): Sample is light orange in color and displays a brecciated texture composed of >2mm-sized angular-subrounded clasts of recrystallized fine to medium-grained poikoblastic-textured chondritic rock set within a fragmental matrix. Sample contains indistinct chondrules, abundant plagioclase (>100 μm), apatite and slightly weathered, rounded to irregular-shaped grains of FeNi and FeS.
Geochemistry: (A.Love, *App*) $Fa_{31.4\pm1.1}$, N=13, Low Ca pyroxene $Fs_{25.0\pm1.0}Wo_{2.0\pm0.2}$, N=12, $An_{39.14}$ n=1.
Classification: Ordinary Chondrite (LL,5 S3, W2)
Specimens: 50.77 g and 1 polished thin section are on deposit at *App*

Northwest Africa 7964 (NWA 7964)
(Northwest Africa)
Purchased: 2013
Classification: Ordinary chondrite (H5)

History: A single crusted stone weighing 350.4 g was purchased in Agadir in 2013 and acquired by Greg Catterton.
Physical characteristics: Dark brown shiny fusion crust fusion crust covers 100% of the angular stone.
Petrography: (A. Love, *App*) Sample dark brown and displays equilibrated texture composed of indistinct chondrules and fragments and metallic grains in a recrystallized matrix. Chondrules have an average diameter of 832 μm and display recrystallized mesostasis. Accessory minerals are apatite, feldspar (Avg. >5 μm, N=85).
Geochemistry: (A.Love, *App*) $Fa_{17.9\pm0.2}$, N=15, Low-Ca pyroxene $Fs_{16.1\pm0.3}Wo_{1.3\pm0.2}$, N=12, $An_{39.14}$, n=1.
Classification: Ordinary Chondrite (H5, S3, W3)
Specimens: 22.58 g and 1 polished thin section are on deposit at *App*

Northwest Africa 7965 (NWA 7965)
(Northwest Africa)
Purchased: 2009
Classification: Ordinary chondrite (LL5-6)
History: A 165 g partially crusted meteorite was found in 2008 and purchased in Agadir, Morocco, in early 2009. Greg Catterton acquired the sample in early 2009 from a meteorite prospector.
Physical characteristics: Stone exhibits orientation with black fusion crust. Fusion crust covers ~90% of stone.
Petrography: (A. Love, *App*) Genomict chondritic breccia containing 0.3-2.8 mm clasts of LL5, LL6, shock-darkened LL5 clasts, multiple types of melt rock and a lithology of uncertain origin all in sharp contact with a groundmass of chondrules and fragments and fine-grained fragmental matrix.
Specimens: 33 g and two polished thin sections at *App*.

Northwest Africa 7971 (NWA 7971)
Morocco
Purchased: 2012
Classification: HED achondrite (Eucrite, monomict)
History: Purchased by Fred Hall and Kelly Manley from a Moroccan mineral dealer in Tucson, February, 2012.
Physical characteristics: Single stone, irregular dark-brown exterior. Saw cut reveals breccia with millimeter-sized clasts set in a brown-gray groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous equilibrated, coarse-grained, intersertal to sub-ophitic eucrite clasts, set in a fine-grained cataclastic matrix of the same mineralogical and chemical composition. Ubiquitous silica, chromite, ilmenite, and low-Ni iron metal.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Pyroxene $Fs_{51.5\pm 3.8}Wo_{12.5\pm5.0}$, Fe/Mn=32±1, n=25; plagioclase $An_{88.6\pm2.9}Ab_{10.7\pm2.7}Or_{0.7\pm0.1}$, n=6.
Classification: Achondrite (Eucrite-mmict)
Specimens: 11 g including a probe mount on deposit at *UNM*, Fred Hall and Kelly Manley hold the main mass.

Northwest Africa 7972 (NWA 7972)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (L5)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2013.
Physical characteristics: Single stone, dark weathered exterior with oxidation, saw cut reveals scattered chondrules and finely disseminated metal/sulfide set in a dark gray, partially oxidized groundmass, also a larger (~4 mm) metal grain observed.

Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows equilibrated chondrules, but some with coarse-grained mesostasis, oxide veinlets, and plagioclase up 50 μm.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Olivine $Fa_{25.5\pm1.2}$, Fe/Mn=52±2, n=7, Low Ca-pyroxene $Fs_{21.2\pm0.4}Wo_{1.3\pm0.2}$, Fe/Mn=29±2, n=5.
Classification: Ordinary chondrite (L5), weathering grade (W2).
Specimens: 20.0 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7973 (NWA 7973)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (H6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2013.
Physical characteristics: Single stone, dark weathered exterior, saw cut reveals numerous small, indistinct chondrules set in a fine-grained brown-gray groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows equilibrated chondrules, abundant oxidized iron-metal, pervasive oxide veinlets.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Olivine $Fa_{19.4\pm0.1}$, Fe/Mn=39±2, n=7, Low Ca-pyroxene $Fs_{17.3\pm0.2}Wo_{1.4\pm0.2}$, Fe/Mn=24±1, n=7.
Classification: Ordinary chondrite (H6), weathering grade (W3).
Specimens: 20.3 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7974 (NWA 7974)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (LL6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2013.
Physical characteristics: Two matching stones, dark weathered exterior, saw cut reveals scattered large chondrules set in a fine grained orange-brown groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows indistinct, equilibrated chondrules, plagioclase up to 100 μm, augite, some oxidation of metal.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Olivine $Fa_{31.7\pm0.4}$, Fe/Mn=64±3, n=14; low Ca-pyroxene $Fs_{25.7\pm0.2}Wo_{2.2\pm0.2}$, Fe/Mn=38±2, n=7.
Classification: Ordinary chondrite (LL6), weathering grade (W2).
Specimens: 22.6 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7975 (NWA 7975)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (L6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2013.
Physical characteristics: Single stone, dark weathered exterior, saw cut reveals scattered indistinct chondrules, fine-grained metal/sulfide, some metal is weathered to small holes, set in a fine-grained, dark-green groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows equilibrated porphyritic chondrules, troilite, chromite, ilmenite, and metal partially oxidized.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Olivine $Fa_{25.6\pm0.2}$, Fe/Mn=52±2, n=6, Low Ca-pyroxene $Fs_{21.5\pm0.5}Wo_{1.7\pm0.3}$, Fe/Mn=30±1, n=7.
Classification: Ordinary chondrite (L6), weathering grade (W2).

Specimens: 20.4 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7976 (NWA 7976)
Morocco
Purchased: 2013
Classification: Enstatite chondrite (EH6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, some fusion crust, saw cut reveals light brown, fine-grained matrix, crisscrossed by veinlets, a few scattered indistinct chondrules.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous enstatite grains ~100 μm, with ubiquitous plagioclase and sulfide. Fe-metal, most now oxidized pockets and veinlets, makes up ~20-30% of this meteorite.
Geochemistry: (C. Agee and M. Spilde, *UNM*) Enstatite $Fs_{0.9\pm0.9}Wo_{1.5\pm0.3}$; plagioclase $Or_{4.2\pm0.4}Ab_{80.6\pm0.6}An_{15.2\pm0.9}$; kamacite Fe=94.0±3.2 Ni=2.9±1.6 Si=3.0±2.2 (all wt%), n=5.
Classification: Enstatite chondrite (EH6), EH based on high Si content of kamacite. Weathering grade W4.
Specimens: 29 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7977 (NWA 7977)
Morocco
Purchased: 2013
Classification: HED achondrite (Diogenite)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to Sean Tutorow for classification, 2012.
Physical characteristics: Numerous matching fragments of the original mass, friable with coarse grained gemmy green pyroxenes, some light tan desert coating present.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows approximately 95% pyroxene, minor iron metal, chromite, troilite, and silica.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Low Ca-pyroxene $Fs_{28.4\pm0.3}Wo_{3.5\pm0.7}$, Fe/Mn=29±1 n=14.
Classification: Achondrite (diogenite). Equilibrated, uniform pyroxene compositions.
Specimens: Two pieces, 33.75 g and 22.1 g, including a probe mount, on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7978 (NWA 7978)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (L3.10)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent Sean Tutorow for classification, 2012.
Physical characteristics: Three matching stones, dark weathered fusion crust, saw cut reveals many densely packed white chondrules of variable size, set in dark-gray matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous unequilibrated chondrules, many are porphyritic, apparent mean diameter 498±335 μm, range measured 100-1500 μm, n=43. Abundant opaque matrix, most chondrules with glass or mesostasis.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Ferroan olivine $Fa_{17.0\pm7.7}$, Fe/Mn=46±19, Cr_2O_3=0.31±0.25 wt%, CaO=0.13±0.06 wt%, n=27; low-Ca pyroxene $Fs_{8.9\pm5.7}Wo_{2.6\pm5.5}$, Fe/Mn=22±14, n=23; augite $Fs_{16.3\pm15.6}Wo_{31.3\pm7.7}$, Fe/Mn=16±12, n=3.
Classification: Ordinary chondrite (L3.10), type 3.10 based on ferroan olivine mean Cr_2O_3 content and sigma from Grossman and Brearley (2005). Weathering grade W2.
Specimens: 22.5 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7979 (NWA 7979)
Morocco
Purchased: 2013
Classification: Rumuruti chondrite (R5)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to Sean Tutorow for classification, 2012.
Physical characteristics: Thirty two small matching stones, light brown, weathered exterior exterior, scattered light-colored chondrules up to 3 mm, set in a gray groundmass with ubiquitous fine-grained opaques.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows some equilibrated chondrules set in an olivine-rich matrix, a few chondrule olivines have magnesian cores.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Olivine $Fa_{39.8\pm0.3}$, Fe/Mn=87±6, NiO=0.18± wt%, n=6; olivine magnesian core $Fa_{15.6}$, Fe/Mn=73; low-Ca pyroxene $Fs_{20.6\pm0.3}Wo_{0.9\pm0.4}$, Fe/Mn=66±17, n=4, augite $Fs_{15.0\pm6.6}Wo_{36.1\pm14.5}$, Fe/Mn=50±6, Cr_2O_3=0.63±0.23 wt%, Na_2O=0.51±0.23 wt%.
Classification: Rumuruti chondrite (R5)
Specimens: 21.1 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7980 (NWA 7980)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (L3.10)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to Sean Tutorow for classification, 2012.
Physical characteristics: Thirty two matching fragments, dark weathered fusion crust, broken surface reveals many densely packed orange-brown chondrules of variable size, set in darker matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous unequilibrated chondrules, many are porphyritic, apparent mean diameter 545±288 μm, range measured 200-1300 μm, n=40. Abundant opaque matrix, most chondrules with glass or mesostasis.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Ferroan olivine $Fa_{20.0\pm7.2}$, Fe/Mn=48±15, Cr_2O_3=0.27±0.18 wt%, range Cr_2O_3=0.04-0.86 wt%, CaO=0.17±0.09 wt%, n=29; low-Ca pyroxene $Fs_{12.0.\pm9.2}Wo_{1.2\pm2.2}$, Fe/Mn=22±13, n=33.
Classification: Ordinary chondrite (L3.10), type 3.10 based on ferroan olivine mean Cr_2O_3 content and sigma from Grossman and Brearley (2005). Weathering grade W2.
Specimens: 20.7 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7981 (NWA 7981)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (LL3.5)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, dark weathered fusion crust, saw cut reveals many chondrules of variable size, some up to 5 mm, set in a reddish brown matrix.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous unequilibrated porphyritic chondrules, most with glass or mesostasis.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Olivine $Fa_{26.8\pm8.5}$, Fe/Mn=73±21, Cr_2O_3=0.08±0.19 wt%, range Cr_2O_3=0.01-0.96 wt%, CaO=0.08±0.06 wt%, n=29; low-Ca pyroxene $Fs_{20.0\pm7.5}Wo_{2.7\pm2.8}$, Fe/Mn=31±18, n=17.
Classification: Ordinary chondrite (LL3.5). Weathering grade W2.
Specimens: 20.9 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7982 (NWA 7982)
Morocco
Purchased: 2013
Classification: HED achondrite (Eucrite)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to Sean Tutorow for classification, 2012.
Physical characteristics: Single stone, with partial, smooth black fusion crust, saw cut reveals light-gray color, plagioclase laths are prominent.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a pyroxene-plagioclase subophitic texture, pyroxenes have exsolution lamellae. Accessory silica, chromite, ilmenite and troilite.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Low Ca-pyroxene $Fs_{60.4\pm1.9}Wo_{4.0\pm1.8}$, Fe/Mn=33±1 n=10, pigeonite $Fs_{52.2}Wo_{13.2}$, Fe/Mn=32, n=1, augite $Fs_{33.8\pm2.8}Wo_{35.4\pm3.2}$, Fe/Mn=32±1, n=2, plagioclase $Or_{0.7\pm0.1}Ab_{12.2\pm0.9}An_{87.1\pm0.8}$, n=3.
Classification: Achondrite (eucrite). Equilibrated basaltic eucrite.
Specimens: 21 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7983 (NWA 7983)
Morocco
Purchased: 2013
Classification: Ureilite
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2012.
Physical characteristics: Two matching stones with a dark brown exterior. Saw cut reveals brown-orange fine-grained texture. Extremely resistant to grinding and polishing.
Petrography: (C. Agee) Dominated by olivine, crosscut and bounded by abundant iron veinlets and blebs, most of which is oxidized. Diamond ubiquitous, often forming elongate domains up to 500 μm. Troilite and Cr-rich sulfide present.
Geochemistry: (C. Agee and N. Muttik) Olivine $Fa_{12.0\pm3.5}$, Fe/Mn=24±6, Cr_2O_3=0.53±0.41 wt%, n=9, low-Ca pyroxene $Fs_{13.1\pm1.9}Wo_{2.7\pm0.2}$, Fe/Mn=25±4, Cr_2O_3=0.75±0.07 wt%, n=2, pigeonite $Fs_{8.9\pm2.7}Wo_{17.9\pm7.4}$, Fe/Mn=13±3, Cr_2O_3=0.88±0.03 wt%, n=2.
Classification: Achondrite (ureilite). Diamond bearing.
Specimens: 20 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 7986 (NWA 7986)
(Northwest Africa)
Purchased: 2013 Jun
Classification: Lunar meteorite (feldspathic breccia)
History: Purchased by Stefan Ralew in June 2013 from a Moroccan dealer at the Ensisheim Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Abundant partly devitrified, glassy matrix (with "swirly" texture) containing embedded small mineral and lithic clasts. Minerals are olivine, orthopyroxene, pigeonite, augite, anorthite, ilmenite, troilite and minor kamacite.
Geochemistry: Olivine ($Fa_{33.4\text{-}34.5}$, FeO/MnO = 83-96), orthopyroxene ($Fs_{34.7}Wo_{2.3}$, FeO/MnO = 53), pigeonite ($Fs_{25.8}Wo_{6.3}$, FeO/MnO = 53), augite ($Fs_{14.5}Wo_{41.7}$; $Fs_{33.5}Wo_{39.5}$, FeO/MnO = 38-68), anorthite ($An_{96.2\text{-}98.5}Or_{0.1}$). Bulk composition (R. Korotev, *WUSL*): INAA of subsamples gave mean abundances of FeO 5.6 wt.%, and (in ppm) Sc 31, La 13.2, Sm 6.2, Eu 1.39, Yb 4.0, Th 1.9.
Classification: Lunar (feldspathic vitric breccia). On the basis of mineralogy, texture and bulk composition, this specimen is paired with NWA 4936, NWA 5406, NWA 6221, NWA 6355, NWA 6470, NWA 6570 and NWA 7190.
Specimens: 12.2 g are at *UWB*. The remainder is with *Ralew*.

Northwest Africa 7987 (NWA 7987)
(Northwest Africa)
Purchased: 2013 Apr
Classification: Ordinary chondrite (H4)
History: Purchased by Steve Witt and S. Addi in April 2013 from a Moroccan dealer.
Petrography: (A. Irving and S. Kuehner, *UWS*) Small, well-formed chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite, taenite and troilite.
Geochemistry: Olivine ($Fa_{19.5\text{-}19.6}$), orthopyroxene ($Fs_{16.5\text{-}16.7}Wo_{0.7\text{-}0.8}$), clinopyroxene ($Fs_{6.7\text{-}8.2}Wo_{44.1\text{-}37.5}$).
Classification: Ordinary chondrite (H4).
Specimens: 38 g and one polished thin section are at *UWB*. The remainder is held jointly by Mr. S. Witt and Mr. S. Addi.

Northwest Africa 7990 (NWA 7990)
(Northwest Africa)
Purchased: 2010
Classification: Ordinary chondrite (LL7)
History: Purchased by Terry Boswell in 2010 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Completely recrystallized with no chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, stained kamacite and troilite.
Geochemistry: Olivine ($Fa_{32.5\text{-}33.0}$), orthopyroxene ($Fs_{26.3\text{-}26.4}Wo_{2.6\text{-}1.9}$), clinopyroxene ($Fs_{10.4\text{-}11.5}Wo_{44.1\text{-}43.1}$).
Classification: Ordinary chondrite (LL7).
Specimens: 26 g and one polished thin section are at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 7991 (NWA 7991)
(Northwest Africa)
Purchased: 2010
Classification: HED achondrite (Diogenite)
History: Purchased by Terry Boswell in 2010 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Medium grained with a metamorphic texture featuring triple grain junctions. Composed predominantly of orthopyroxene with accessory olivine, anorthitic plagioclase, chromite, Ni-poor metal and troilite.
Geochemistry: Orthopyroxene ($Fs_{25.2\text{-}25.3}Wo_{3.4\text{-}3.8}$; FeO/MnO = 28-31), olivine ($Fa_{31.1\text{-}32.1}$; FeO/MnO = 50-52).
Specimens: 9.6 g and one polished thin section are at *UWB*. The remainder is held by Mr. T. Boswell.

Northwest Africa 7992 (NWA 7992)
(Northwest Africa)
Purchased: 2010
Classification: Ordinary chondrite (H6)
History: Purchased by Terry Boswell in 2010 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very sparse, small chondrules and fairly abundant altered metal. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{18.8\text{-}19.2}$), orthopyroxene ($Fs_{16.4\text{-}16.6}Wo_{1.6\text{-}1.5}$), clinopyroxene ($Fs_{5.2\text{-}6.2}Wo_{46.5\text{-}41.5}$).
Classification: Ordinary chondrite (H6).
Specimens: 21 g and one polished thin section are at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 7993 (NWA 7993)
(Northwest Africa)
Purchased: 2010
Classification: Ordinary chondrite (L6)

History: Purchased by Terry Boswell in 2010 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Rare chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{25.2-25.6}$), orthopyroxene ($Fs_{21.0-21.7}Wo_{1.7-1.8}$), clinopyroxene ($Fs_{8.0-8.2}Wo_{45.2-45.1}$).
Classification: Ordinary chondrite (L6).
Specimens: 21 g and one polished thin section are at *UWB*. The remainder is held by Mr. T. Boswell.

Northwest Africa 7994 (NWA 7994)
(Northwest Africa)
Purchased: 2010
Classification: HED achondrite (Diogenite)
History: Purchased by Terry Boswell in 2010 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Coarse aggregate of orthopyroxene grains meeting at triple junctions with accessory chromite and stained troilite.
Geochemistry: Orthopyroxene ($Fs_{22.4-22.9}Wo_{1.3-1.4}$; FeO/MnO = 28-32).
Specimens: 19 g and one polished thin section are at *UWB*. The remainder is held by Mr. T. Boswell.

Northwest Africa 7995 (NWA 7995)
(Northwest Africa)
Purchased: 2011
Classification: Ordinary chondrite (H7)
History: Purchased by Terry Boswell in 2011 from a dealer in Midelt, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Completely recrystallized with no chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite. Thin veinlets of goethite crosscut the specimen.
Geochemistry: Olivine ($Fa_{19.2-19.3}$), orthopyroxene ($Fs_{16.7-16.9}Wo_{4.0-4.4}$), clinopyroxene ($Fs_{6.9-9.1}Wo_{44.3-39.4}$)
Classification: Ordinary chondrite (H7).
Specimens: 22 g and one polished thin section are at *UWB*. The remainder is held by Mr. T. Boswell.

Northwest Africa 7996 (NWA 7996)
(Northwest Africa)
Purchased: 2011
Classification: Ordinary chondrite (H4)
History: Purchased by Terry Boswell in 2011 from a dealer in Midelt, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, small chondrules and fairly abundant metal. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{18.9-19.0}$), orthopyroxene ($Fs_{15.9-16.4}Wo_{1.1-1.5}$), clinopyroxene ($Fs_{5.5-5.9}Wo_{45.6-45.7}$).
Classification: Ordinary chondrite (H4).
Specimens: 20.2 g and one polished thin section are at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 7997 (NWA 7997)
(Northwest Africa)
Purchased: 2011
Classification: HED achondrite (Diogenite)
History: Purchased by Terry Boswell in 2011 from a dealer in Midelt, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very fresh specimen composed of interlocking grains of clear orthopyroxene with accessory olivine, chromite and troilite. The mafic silicates have variable composition from grain to grain.
Geochemistry: Orthopyroxene ($Fs_{23.8}Wo_{1.6}$; $Fs_{25.3}Wo_{3.2}$; FeO/MnO = 28-30), olivine ($Fa_{25.1}$; $Fa_{28.6}$; FeO/MnO = 44).
Specimens: 12 g and one polished thin section are at *UWB*. The remainder is held by Mr. T. Boswell.

Northwest Africa 7998 (NWA 7998)
(Northwest Africa)
Purchased: 2013 May
Classification: Ordinary chondrite (L5)
History: Purchased by *Aaronson* in Temara, Morocco in May 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Medium-sized chondrules. Olivine, orthopyroxene, augite, sodic plagioclase, altered kamacite, chromite and troilite. Some thin cross-cutting shock veinlets.
Geochemistry: Olivine ($Fa_{26.7\text{-}26.8}$), orthopyroxene ($Fs_{21.7\text{-}23.4}Wo_{1.4\text{-}1.0}$), augite ($Fs_{8.3\text{-}9.3}Wo_{44.8\text{-}45.5}$).
Classification: Ordinary chondrite (L5).
Specimens: 30 g and one polished thin section are at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 7999 (NWA 7999)
(Northwest Africa)
Purchased: 2013 Jul
Classification: HED achondrite (Eucrite, polymict)
History: Purchased by Adam Aaronson in Temara, Morocco in July 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fragmental breccia composed of basaltic eucrite clasts and related debris, plus ~5 vol.% of angular diogenitic orthopyroxene grains with concentric, ferroan rims. Eucritic material consists of exsolved pigeonite, calcic plagioclase, silica, fayalitic olivine, ilmenite, with minor baddeleyite, stained Ni-free metal and troilite.
Geochemistry: Host orthopyroxene ($Fs_{59.8}Wo_{2.6}$; FeO/MnO = 29), clinopyroxene exsolution lamellae ($Fs_{25.1\text{-}29.0}Wo_{38.5\text{-}40.6}$; FeO/MnO = 31-32), diogenitic orthopyroxene ($Fs_{32.4}Wo_{5.2}$; FeO/MnO = 28), olivine ($Fa_{83.8\text{-}84.7}$; FeO/MnO = 39).
Classification: Eucrite (polymict).
Specimens: 21 g and one polished thin section are at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 8000 (NWA 8000)
(Northwest Africa)
Purchased: 2013 Jun
Classification: HED achondrite (Diogenite)
History: Purchased by Stefan *Ralew* in June 2013 from a dealer in Agadir, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively coarse grained, equigranular assemblage of predominantly orthopyroxene plus ~10 vol.% calcic plagioclase with accessory clinopyroxene, chromite and troilite.
Geochemistry: Orthopyroxene ($Fs_{34.1\text{-}34.2}Wo_{2.4\text{-}2.5}$, FeO/MnO = 28-31), plagioclase ($An_{88.1\text{-}89.0}Or_{0.5\text{-}0.2}$), clinopyroxene ($Fs_{13.6\text{-}13.8}Wo_{43.3\text{-}43.4}$, FeO/MnO = 25-26).
Classification: Diogenite (noritic). Like NWA 6928, this is a rare example of a noritic lithology related to diogenites.
Specimens: 4.76 g and one polished thin section are at *UWB*. The remainder is held by Mr. S. *Ralew*.

Northwest Africa 8001 (NWA 8001)
(Northwest Africa)
Purchased: 2013 Jun
Classification: Lunar meteorite (feldspathic breccia)
History: Purchased by Darryl Pitt in June 2013 from a Moroccan dealer.
Petrography: (A. Irving and S. Kuehner, *UWS*) Complex polymict breccia composed of angular mineral clasts, some mare basalt clasts and glass spheres in a fine grained matrix. Sparse grains of forsterite are present; other minerals are more ferroan olivine, low-Ca pyroxene, subcalcic augite, anorthite, ilmenite and troilite.

Geochemistry: Forsterite ($Fa_{5.7\text{-}9.0}$; FeO/MnO = 91-104), ferroan olivine ($Fa_{39.7\text{-}47.7}$; FeO/MnO = 89-95), low-Ca pyroxene ($Fs_{31.2\text{-}33.5}Wo_{5.6\text{-}3.9}$; FeO/MnO = 56-63), subcalcic augite ($Fs_{17.2\text{-}44.4}Wo_{36.5\text{-}26.6}$; FeO/MnO = 49-62), subcalcic ferroaugite ($Fs_{58.8}Wo_{33.4}$; FeO/MnO = 72), anorthite ($An_{96.8\text{-}97.3}Or_{0.1\text{-}0.2}$). Bulk composition (R. Korotev, *WUSL*): INAA of subsamples gave mean abundances of FeO 4.8 wt.%, and (in ppm) Sc 9, La 7.9, Sm 3.7, Eu 0.96, Yb 2.7, Th 1.3.
Classification: Lunar (mingled regolithic breccia). Olivine as magnesian as that present in this meteorite is unknown among other lunar specimens.
Specimens: 4.7 g and one polished thin section are at *UWB*. The remainder is with *DPitt*.

Northwest Africa 8002 (NWA 8002)
(Northwest Africa)
Purchased: 2013 Jun
Classification: Ordinary chondrite (L3)
History: Purchased by Darryl Pitt in June 2013 from a dealer in Erfoud, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, medium-sized (0.3-1.6 mm) chondrules. Olivine, orthopyroxene, subcalcic augite, augite, sodic plagioclase, chromite, altered kamacite and troilite.
.
Geochemistry: Olivine ($Fa_{1.0\text{-}49.9}$; Cr_2O_3 in ferroan examples is 0.06-0.20 wt.%, mean 0.11±0.05 wt.%, N = 7), orthopyroxene ($Fs_{3.5\text{-}40.3}Wo_{0.5\text{-}2.4}$), subcalcic augite ($Fs_{5.8}Wo_{34.2}$), augite ($Fs_{9.5}Wo_{45.1}$).
Classification: Ordinary chondrite (L3.5). Estimation of subtype based on histograms of Cr_2O_3 distribution in ferroan olivine given in Fig. 4 of Grossman and Brearley (2005).
Specimens: 17.8 g and one polished thin section are at *UWB*. The remainder is held by *DPitt*.

Northwest Africa 8003 (NWA 8003)
(Northwest Africa)
Purchased: 2013 Jul
Classification: HED achondrite (Eucrite)
History: Purchased by Aras Jonikas from a Moroccan dealer in July 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh specimen with intersertal texture and composed mainly of prismatic exsolved pigeonite and thin laths of calcic plagioclase with accessory silica, ilmenite and troilite. Thin dark, glassy shock veinlets cross-cut the specimen.
Geochemistry: Host orthopyroxene ($Fs_{65.6\text{-}66.1}Wo_{2.1\text{-}1.7}$; FeO/MnO = 32-33), clinopyroxene exsolution lamellae ($Fs_{28.7\text{-}28.9}Wo_{44.1\text{-}44.3}$; FeO/MnO = 30-33).
Classification: Eucrite (basaltic).
Specimens: 21.3 g and one polished thin section are at *UWB*. The remainder is held by Mr. A. Jonikas.

Northwest Africa 8004 (NWA 8004)
(Northwest Africa)
Purchased: 2013 April
Classification: Carbonaceous chondrite (CR2)
History: Purchased by B. Li in Tucson in April 2013.
Physical characteristics: Meteorite fragment, surface party covered by fusion crust, saw cut face shows many chondrules, CAIs, black inclusions, and metal specks, set in a dark-colored matrix. Magnetic susceptibility log $\chi = 4.92$.
Petrography: (R. Bartoschewitz, *Bart*, and B. Li, *Beijing*) Microprobe examination of a polished thin section shows dominantly porphyritic and rare radial chondrules up to 0.3 mm (av. 0.1 mm), some rims decorated with metal/sulfide blebs. Abundant, fine-grained matrix with metal grains up to 0.2 mm.
Geochemistry: (R. Bartoschewitz, *Bart*, P. Appel and B. Mader, *Kiel*) Olivine: $Fa_{0.4\text{-}41.4}$, mean $Fa_{13.4\pm15.1}$; Cr_2O_3=0.38±0.16, CaO=0.29±0.13 wt% (n=22); enstatite: $Fs_{0.9\text{-}8.1}Wo_{0.5\text{-}2.1}$, mean $Fs_{4.1\pm2.7}Wo_{1.1\pm0.5}$ (n=8); Kamacite: Ni=2.2-7.8, Co=0.27-0.41 (wt.%); troilite, pentlandite (Ni=23.9, Co=1.0 wt.%)
Classification: Carbonaceous chondrite (CR2).

Specimens: 3.5 g on deposit at *Kiel*, B. Li holds the main mass and 1.7 g with *Bart*.

Northwest Africa 8007 (NWA 8007)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (L3.2)
History: Purchased from a dealer in Morocco in 2013 by Steve Witt and Mr. Smara Addi.
Physical characteristics: Three matching stones, dark brown weathered exterior, no fusion crust, sawn surface reveals densely packed chondrules of variable size.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous unequilibrated chondrules, many are porphyritic, apparent mean diameter 523±308 μm, range 150-2000 μm, n=52. Abundant opaque matrix, most chondrules with glass or mesostasis. Aluminous augite, Fe,Ni-metal, sulfide present.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Ferroan olivine $Fa_{17.0\pm10.1}$, Fe/Mn=63±43, Cr_2O_3=0.14±0.17 wt%, range Cr_2O_3=0.01-0.58 wt%, CaO=0.11±0.08 wt%, n=32; low-Ca pyroxene $Fs_{9.5\pm5.1}Wo_{1.3\pm2.0}$, Fe/Mn=26±21, n=29.
Classification: Ordinary chondrite (L3.2), transitional between type 3.2 and 3.15 based on ferroan olivine mean Cr_2O_3 content and sigma from Grossman and Brearley (2005). Weathering grade W1.
Specimens: 25.7 g including a probe mount on deposit at *UNM*, Steve Witt holds the main mass.

Northwest Africa 8009 (NWA 8009)
(Northwest Africa)
Purchased: 2013 July
Classification: HED achondrite (Eucrite)
History: The meteorite was found by an anonymous finder in northwest Africa and bought by Ke Zuokai. The total mass of the meteorite is about 7.5 kg.
Petrography: Numerous equilibrated,coarsed-grained eucrite clasts set in a fine-grained matrix of the same mineralogical and chemical composition. Major phases include pyroxenes and plagioclase. Silica is ubiquitous.
Geochemistry: Two types of pyroxene are present ($Wo_{4-11}Fs_{50-56}$ and $Wo_{55-56}Fs_{24-27}$). The molar ratio of Fe/Mn is 31-33. Plagioclase is calcic (An_{85}).

Northwest Africa 8010 (NWA 8010)
Morocco
Found: 2013
Classification: Lunar meteorite (feldspathic breccia)
History: Reported found near Zagora, 2013.
Physical characteristics: Single stone, gray-brown fusion crust, black melt veins visible through the crust. Saw cut reveals dark breccia clasts with fragmental feldspar and light fine-grained clasts up to 1-2 cm, bounded by black shock melt veins 1-4 mm wide, melt veins contain vesicles up to 1 mm.
Petrography: (C. Agee, *UNM*) Fragmental breccia with melt veins. Anorthositic and gabbroic clasts, fragmental plagioclase, pyroxene, olivine, oxides and sulfides set in a cataclastic groundmass. Abundant glassy melt veins with suspended submicron metal/sulfide blebs, plumose quench crystal zones up to 1 mm wide at groundmass cooling contacts. Vesicles confined mostly in the center of melt veins. Shock melt spherule 500 μm.
Geochemistry: (C. Agee and N. Muttik, *UNM*). Olivine $Fa_{31.7\pm7.5}$, Fe/Mn=93±5, n=14; forsteritic olivine $Fa_{7.4\pm1.5}$, Fe/Mn=100±16, n=2; pyroxene $Fs_{33.8\pm11.1}Wo_{17.0\pm9.9}$, Fe/Mn=57±7, n=21; plagioclase $An_{96.2\pm1.3}Ab_{3.4\pm1.2}Or_{0.4\pm0.2}$, n=10; glassy impact melt (mean value from EMPA with 20 μm beam) SiO_2=45.55±1.28, TiO_2=0.52±0.23, Al_2O_3=25.34±2.86, Cr_2O_3=0.13±0.03, MgO=7.54±2.21, FeO=5.99±1.03, MnO=0.08±0.03, CaO=14.35±1.41, Na_2O=0.42±0.16, K_2O=0.16±0.07 (all wt%), n=7.

Classification: Achondrite (lunar meteorite). Feldspathic impact melt breccia. Chemical composition of glassy impact melt (proxy for bulk composition) is that of high-alumina basalt.
Specimens: A total of 11.6 g, including a probe mount, is on deposit at *UNM*, *MtMorgan* and *Reed* hold the main mass.

Northwest Africa 8012 (NWA 8012)
(Northwest Africa)
Purchased: 2013 Jul
Classification: Rumuruti chondrite (R6)
History: Purchased by Adam Aaronson in July 2013 in Temara, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Highly recrystallized with very sparse chondrule remnants. Composed of olivine, clinopyroxene, sodic plagioclase, troilite, pentlandite, Al-rich chromite and Cr-bearing ulvöspinel. Sulfides occur mainly as separated, relatively large, slightly stained grains.
Geochemistry: Olivine ($Fa_{39.9-40.0}$; FeO/MnO = 83-91), clinopyroxene ($Fs_{10.5-10.6}Wo_{50.0-50.2}$; FeO/MnO = 73-81).
Classification: R6 chondrite.
Specimens: 20.3 g and one polished thin section are at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 8013 (NWA 8013)
(Northwest Africa)
Purchased: 2013 Aug
Classification: Ordinary chondrite (LL6)
History: Purchased by *Aaronson* in Temara, Morocco in August 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Mostly recrystallized, but with remnants of relatively large chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{31.3-32.4}$), orthopyroxene ($Fs_{26.7-26.8}Wo_{3.0-2.6}$), augite ($Fs_{10.9-11.4}Wo_{44.5-43.2}$).
Classification: Ordinary chondrite (LL6).
Specimens: 16 g and one polished thin section are at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 8014 (NWA 8014)
Northwest Africa
Purchased: 2013 May
Classification: Ungrouped achondrite
History: Purportedly found at the same site as NWA 7325 and other such stones near Bir el Abbas, Morocco. Purchased by Naveen Jain in May 2013 from a dealer in Zagora, Morocco.
Physical characteristics: A dense, dark green stone (210 g) with patches of pale green fusion crust. The interior consists mainly of bright green grains and pale gray grains with a peculiar "frosty" appearance.
Petrography: (A. Irving and S. Kuehner, *UWS*) Medium grained, microgabbroic igneous rock composed of calcic plagioclase, diopside and forsterite with accessory Cr-troilite, Ni-poor kamacite and rare grains of eskolaite, Cr-bearing Fe metal, suessite and K-Fe sulfide (possibly rasvumite). Plagioclase exhibits anomalously low birefringence, and contains abundant tiny, rounded inclusions of Cr-troilite and kamacite (especially adjacent to diopside grains. Diopside exhibits two sets of planar shock twin lamellae, and olivine grains have irregular, rounded shapes (with sinuous "moat-like" cavities along some margins).
Geochemistry: Olivine ($Fa_{2.2-2.3}$, Cr_2O_3 0.4 wt.%), clinopyroxene ($Fs_{0.8-0.9}Wo_{44.7-44.3}$, TiO_2 0.02-0.03 wt.%, Al_2O_3 2.8-2.9 wt.%, Cr_2O_3 1.0 wt.%).
Classification: Achondrite (ungrouped). This stone is paired with NWA 7325.
Specimens: 23 g and one polished thin section are at *UWB*. The remainder is held by Mr. N. Jain.

Northwest Africa 8016 (NWA 8016)
(Northwest Africa)

Purchased: 2011 Jan
Classification: Ordinary chondrite (LL6)
History: Purchased in Temara, Morocco, by Adam Aaronson in January 2011.
Petrography: (A. Irving and S. Kuehner, *UWS*) Mostly recrystallized with very sparse chondrules.
Geochemistry: Olivine ($Fa_{30.7\text{-}30.9}$), orthopyroxene ($Fs_{24.2\text{-}24.7}Wo_{1.4\text{-}2.0}$), augite ($Fs_{9.4\text{-}10.3}Wo_{43.7\text{-}43.5}$).
Classification: Ordinary chondrite (LL6).
Specimens: 3.8 g including one polished thin section at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 8017 (NWA 8017)
(Northwest Africa)
Purchased: 2011 Aug
Classification: Ordinary chondrite (LL6)
History: Purchased in Temara, Morocco, by Adam Aaronson in August 2011.
Petrography: (A. Irving and S. Kuehner, *UWS*) Sparse chondrules.
Geochemistry: Olivine ($Fa_{29.9\text{-}30.8}$), orthopyroxene ($Fs_{24.8\text{-}25.3}Wo_{2.3\text{-}2.0}$), augite ($Fs_{9.5\text{-}10.8}Wo_{44.3\text{-}42.8}$).
Classification: Ordinary chondrite (LL6).
Specimens: 22.5 g including one polished thin section at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 8018 (NWA 8018)
(Northwest Africa)
Purchased: 2011 Aug
Classification: Ordinary chondrite (H4)
History: Purchased in Temara, Morocco by Adam Aaronson in August 2011.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-developed, small chondrules.
Geochemistry: Olivine ($Fa_{18.2\text{-}18.3}$), orthopyroxene ($Fs_{15.6\text{-}15.9}Wo_{1.3\text{-}1.2}$), augite ($Fs_{5.2\text{-}5.6}Wo_{45.7\text{-}44.3}$).
Classification: Ordinary chondrite (H4).
Specimens: 20.2 g including one polished thin section at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 8019 (NWA 8019)
(Northwest Africa)
Purchased: 2013 Aug
Classification: Ordinary chondrite (H4)
History: Purchased in Temara, Morocco by Adam Aaronson in August 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-developed, small chondrules in a relatively coarse grained matrix.
Geochemistry: Olivine ($Fa_{19.4\text{-}19.5}$), orthopyroxene ($Fs_{17.1\text{-}17.4}Wo_{0.9\text{-}1.0}$), augite ($Fs_{5.3\text{-}6.5}Wo_{47.1\text{-}46.3}$).
Classification: Ordinary chondrite (H4).
Specimens: 20.1 g including one polished thin section at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 8020 (NWA 8020)
(Northwest Africa)
Purchased: 2013 Aug
Classification: HED achondrite (Eucrite)
History: Purchased by Adam Aaronson in Temara, Morocco, in August 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Monomict breccia composed of eucrite clasts with subophitic texture. Minerals are exsolved pigeonite, calcic plagioclase, silica, ilmenite, Ti-chromite, troilite and minor barite.
Geochemistry: Host orthopyroxene ($Fs_{62.1\text{-}62.2}Wo_{2.7\text{-}2.6}$; FeO/MnO = 29), clinopyroxene exsolution lamellae ($Fs_{27.4\text{-}27.8}Wo_{44.5\text{-}43.6}$; FeO/MnO = 27-31), plagioclase ($An_{86.2\text{-}88.9}Or_{0.3\text{-}0.2}$).
Classification: Eucrite (basaltic, monomict).
Specimens: 17 g and one polished thin section are at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 8021 (NWA 8021)
(Northwest Africa)
Purchased: 2013 Jul
Classification: HED achondrite (Eucrite)
History: Purchased by Aras Jonikas from a Moroccan dealer in July 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Monomict breccia composed of crystal debris and related small clasts with a gabbroic eucrite lithology. Predominantly exsolved pigeonite and shocked anorthitic plagioclase (characterized by very patchy, birefringent domains and some vesicles) plus accessory Ti-chromite, fayalitic olivine, rare taenite and regions with quench texture (composed of glassy and fine "herringbone" crystals). In thin section the pyroxene has a distinctive pale-brown color with fox-brown regions. Secondary (terrestrial) calcite and barite are present.
Geochemistry: Host orthopyroxene ($Fs_{60.6\text{-}60.9}Wo_{2.3\text{-}2.6}$; FeO/MnO = 28-30), clinopyroxene exsolution lamellae ($Fs_{26.3\text{-}28.9}Wo_{43.5\text{-}42.2}$; FeO/MnO = 26-28), plagioclase ($An_{89.6\text{-}90.7}Or_{0.4\text{-}0.5}$).
Classification: Eucrite (monomict, gabbroic).
Specimens: 27.5 g and one polished thin section are at *UWB*. The remainder is held by Mr. A. Jonikas.

Northwest Africa 8022 (NWA 8022)
(Northwest Africa)
Purchased: 2013 May
Classification: Lunar meteorite (feldspathic breccia)
History: Purchased in Temara, Morocco by Adam Aaronson in April 2013.
Physical characteristics: A single, fine grained stone (1226 g) with patches of remnant, brown fusion crust.
Petrography: (A. Irving and S. Kuehner, *UWS*) Highly recrystallized fragmental feldspathic breccia containing some larger anorthite grains (up to 2 mm), but mostly composed of extremely fine grained (~10 microns) anorthite, pigeonite, olivine, ilmenite, Cr-ulvöspinel, fayalite, kamacite, pentlandite and rare awaruite.
Geochemistry: Anorthite ($An_{95.9}Or_{0.3}$), pigeonite ($Fs_{20.6\text{-}22.2}Wo_{21.5\text{-}10.0}$; FeO/MnO = 50-58), olivine ($Fa_{31.5\text{-}31.7}$; FeO/MnO = 93-101). Bulk composition (R. Korotev, *WUSL*): INAA of subsamples gave mean abundances of FeO 3.7 wt.%, and (in ppm) Sc 5, La 2.7, Sm 1.2, Eu 0.98, Yb 1.1, Th 0.7.
Classification: Lunar (feldspathic granulitic breccia).
Specimens: 21.5 g are at *UWB*. The remainder is with *Aaronson*.

Northwest Africa 8023 (NWA 8023)
(Northwest Africa)
Purchased: 2013
Classification: Ordinary chondrite (L6)
History: One crusted stone weighing 178.8 g was found and purchased in Agadir in 2013. Greg Catterton acquired the sample from a meteorite prospector in 2013.
Physical characteristics: Dark brown weathered fusion crust fusion crust covers 55% of the angular stone.
Petrography: (A. Love, *App*): Sample is mottled orange and black on a cut face and displays a recrystallized chondritic texture composed of indistinct chondrules (avg. diameter 1259 μm), fragments and mineral clasts that are embayed by shock-darkened regions with more abundant shock veins and glass. Sample contains abundant secondary feldspar grains with an avg. long dimension of 98 μm (n=26).
Geochemistry: $Fa_{23.9\pm}$N=18, Low Ca pyroxene $Fs_{19.2\pm0.3}Wo_{1.8\pm0.5}$, N=14; $An_{39.14}$ n=1.
Classification: Ordinary Chondrite (L6, S3, W2)
Specimens: 20.16 g and one polished thin section are on deposit at *App*.

Northwest Africa 8031 (NWA 8031)

(Northwest Africa)
Purchased: 2012
Classification: Ordinary chondrite (L3.9)
History: Purchased by Terry Boswell in 2012 from a dealer in Midelt, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Abundant well-formed, medium-sized (0.3-2.3 mm) chondrules and moderately abundant altered metal. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{24.2-25.5}$, N = 7), orthopyroxene ($Fs_{2.7-21.5}Wo_{0.3-1.7}$, N = 4), clinopyroxene ($Fs_{8.5-8.3.3-43.8}$).
Classification: Ordinary chondrite (L3.9). Although the olivine in this specimen is fairly well equilibrated, the orthopyroxenes are not.
Specimens: 22.5 g and one polished thin section are at *UWB*. The remainder is held by Mr. T. Boswell.

Northwest Africa 8032 (NWA 8032)
(Northwest Africa)
Purchased: 2012
Classification: Ordinary chondrite (L6)
History: Purchased by Terry Boswell in 2012 from a dealer in Midelt, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Rare chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{25.0-25.2}$), orthopyroxene ($Fs_{21.8-22.6}Wo_{1.2-1.6}$), clinopyroxene ($Fs_{8.0-8.7}Wo_{45.8-45.6}$).
Classification: Ordinary chondrite (L6).
Specimens: 25.5 g and one polished thin section are at *UWB*. The remainder is held by Mr. T. Boswell.

Northwest Africa 8034 (NWA 8034)
(Northwest Africa)
Purchased: 2012
Classification: Ordinary chondrite (L5)
History: Purchased by Terry Boswell in 2012 from a dealer in Midelt, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Sparse, medium-sized chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{24.9-25.4}$), orthopyroxene ($Fs_{21.1-21.4}Wo_{1.8-1.9}$), clinopyroxene ($Fs_{9.9-11.0}Wo_{38.1-38.4}$).
Classification: Ordinary chondrite (L5).
Specimens: 22.7 g and one polished thin section are at *UWB*. The remainder is held by Mr. T. Boswell.

Northwest Africa 8035 (NWA 8035)
(Northwest Africa)
Purchased: 2012
Classification: Ordinary chondrite (L6)
History: Purchased by Terry Boswell in 2012 from a dealer in Midelt, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Rare chondrules. Olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, altered kamacite and troilite.
Geochemistry: Olivine ($Fa_{25.2-25.4}$), orthopyroxene ($Fs_{21.8-22.2}Wo_{1.7-1.8}$), clinopyroxene ($Fs_{8.6-9.3}Wo_{45.2-44.5}$).
Classification: Ordinary chondrite (L6).
Specimens: 7.1 g and one polished thin section are at *UWB*. The remainder is held by Mr. T. Boswell.

Northwest Africa 8037 (NWA 8037)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Ordinary chondrite (H3)

History: Purchased by Eric Twelker in February 2013 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Relatively fresh specimen composed of very closely-packed, well-formed, medium-sized (0.4-2.1 mm) chondrules in a sparse black matrix with very low metal content. Olivine, orthopyroxene, pigeonite, diopside, sodic plagioclase, altered kamacite, taenite, troilite and rare chromite.
Geochemistry: Olivine ($Fa_{0.5\text{-}94.8}$; Cr_2O_3 in ferroan olivine 0.09-0.22 wt.%, mean 0.12±0.05 wt.%, N = 8), orthopyroxene ($Fs_{0.8\text{-}22.4}Wo_{0.5\text{-}3.2}$), pigeonite ($Fs_{22.9}Wo_{10.7}$), diopside ($Fs_{2.4}Wo_{39.3}$). Oxygen isotopes (K. Ziegler, *UNM*): analyses of acid-washed subsamples by laser fluorination gave (all in per mil): $\delta^{17}O$ = 2.700, 2.988, 2.873; $\delta^{18}O$ = 3.800, 4.255, 4.097; $\Delta^{17}O$ = 0.694, 0.741, 0.710 (for a TFL slope of 0.528 per mil).
Classification: Ordinary chondrite (Type 3). The low metal content and freshness of this unequilibrated chondrite specimen are at odds with its oxygen isotopic composition, which plots on the trend for H chondrites.
Specimens: 23.7 g and one polished thin section are at *UWB*. The remainder is held by *Twelker*.

Northwest Africa 8038 (NWA 8038)
(Northwest Africa)
Purchased: 2013 Feb
Classification: Carbonaceous chondrite (CO3)
History: Purchased by Eric Twelker in February 2013 from a Moroccan dealer at the Tucson Gem and Mineral Show.
Petrography: (A. Irving and S. Kuehner, *UWS*) Small chondrules (mostly 0.2-0.6 mm, some up to 1.5 mm) and fine-grained CAI (composed of hibonite and spinel, with rims of aluminous clinopyroxene) in a dark brown, stained matrix. Minor pentlandite occurs in the matrix.
Geochemistry: Olivine ($Fa_{0.3\text{-}39.1}$; Cr_2O_3 in ferroan olivine 0.06-0.15 wt.%, mean 0.09 wt.%, s.d. 0.03 wt.%, N = 7), orthopyroxene ($Fs_{1.3\text{-}8.9}Wo_{4.3\text{-}2.8}$), clinopyroxene ($Fs_{1.4}Wo_{38.6}$; $Fs_{1.3}Wo_{48.8}$; $Fs_{16.9}Wo_{53.0}$).
Classification: Carbonaceous chondrite (CO3). Subtype is estimated to be 3.5 on the basis of the narrow distribution of Cr_2O_3 in ferroan olivine.
Specimens: 22.3 g and one polished thin section are at *UWB*. The remainder is held by *Twelker*.

Northwest Africa 8039 (NWA 8039)
(Northwest Africa)
Purchased: 2013
Classification: Ordinary chondrite (H3)
History: Purchased by Eric Twelker in 2013 from a dealer in Zagora, Morocco.
Petrography: (A. Irving and S. Kuehner, *UWS*) Very fresh specimen composed of small (0.2-0.9 mm, some up to 1.7 mm), well-formed chondrules and some mineral fragments in a black, relatively metal-rich matrix. Olivine, orthopyroxene, subcalcic augite, diopside, sodic plagioclase, chromite, kamacite and troilite.
Geochemistry: Olivine ($Fa_{0.9\text{-}53.0}$; Cr_2O_3 in ferroan olivine 0.07-0.20 wt.%, mean 0.12±0.05 wt.%, N = 8), orthopyroxene ($Fs_{1.3\text{-}19.8}Wo_{0.9\text{-}2.7}$), subcalcic augite ($Fs_{7.4}Wo_{29.6}$), diopside ($Fs_{0.9}Wo_{47.1}$).
Classification: Ordinary chondrite (H3.4). Estimation of subtype based on histograms of Cr_2O_3 distribution in ferroan olivine given in Fig. 4 of Grossman and Brearley (2005).
Specimens: 19.9 g and one polished thin section are at *UWB*. The remainder is held by *Twelker*.

Northwest Africa 8040 (NWA 8040)
(Northwest Africa)
Purchased: 2013
Classification: Carbonaceous chondrite (CK4)
History: Purchased by Eric Twelker in 2013 from a dealer in Zagora, Morocco.

Petrography: (A. Irving and S. Kuehner, *UWS*) Separated, well-formed, medium-sized (0.8-2 mm), porphyritic magnetite-bearing chondrules in a matrix containing stained Cr-bearing magnetite.
Geochemistry: Olivine ($Fa_{28.6-28.9}$, n = 3), orthopyroxene ($Fs_{24.0-25.3}Wo_{0.6-0.5}$), clinopyroxene ($Fs_{8.3-9.7}Wo_{47.2-45.3}$).
Classification: Carbonaceous chondrite (CK4).
Specimens: 26.8 g and one polished thin section are at *UWB*. The remainder is held by *Twelker*.

Northwest Africa 8042 (NWA 8042)
(Northwest Africa)
Purchased: 2013
Classification: Ordinary chondrite (H5)
History: One crusted stone weighing 131.8 g was found and purchased in Agadir in 2013. Greg Catterton acquired the sample from a meteorite prospector in 2013.
Physical characteristics: Dark brown weathered fusion crust fusion crust covers 99% of the rounded ellipsoidal stone.
Petrography: (A. Love, *App*): Sample is orange in color and displays a recrystallized chondritic texture composed of distinct, well-formed chondrules (mean diameter 685 μm, some of which show flattening with aspect ratios near 3:2), fragments and mineral clasts in a recrystallized matrix. Contains weathered, irregularly shaped grains of FeNi and FeS.
Geochemistry: (A. Love, *App*) Olivine, $Fa_{18.4\pm0.3}$, N=16; Low Ca pyroxene, $Fs_{16.2\pm0.3}Wo_{1.9\pm1.8}$, N=12.
Classification: Ordinary Chondrite (H5, S3, W3)
Specimens: 20.22 g and 1 polished thin section are on deposit at *App*

Northwest Africa 8043 (NWA 8043)
Morocco
Purchased: 2013
Classification: HED achondrite (Diogenite)
History: Purchased by Blaine Reed in July 2013.
Physical characteristics: Many matching pieces, friable with coarse grained, transparent, green pyroxenes; some light tan desert coating present.
Petrography: Microprobe examination of a polished mount shows approximately 99% pyroxene, accessory chromite and silica.
Geochemistry: (C. Agee and N. Muttik, *UNM*) EMPA. Low Ca-pyroxene $Fs_{28.2\pm0.5}Wo_{3.6\pm1.0}$, Fe/Mn=29±1 n=7.
Classification: Achondrite (Diogenite). Equilibrated, uniform pyroxene compositions. Likely paired with NWA 7977.
Specimens: 32.8 g including a probe mount on deposit at *UNM*, *Reed* holds the main mass.

Northwest Africa 8044 (NWA 8044)
Morocco
Purchased: 2011
Classification: HED achondrite (Howardite)
History: Purchased by Blaine Reed in Tucson 2011.
Physical characteristics: Thirty pieces, weathered exterior, sawn surface shows dark colored, heterogeneous breccia, with oxidized crosscutting veins.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows a dominant diogenite lithology of monomineralic pyroxene, but also numerous clasts and domains of basaltic to cumulate eucrite lithologies. Accessory troilite, Fe-Ni metal, ilmenite, and chromite. Significant fracture filling by desert Fe-oxide, carbonate, and barite cements, including rafted terrestrial quartz sand grains.

Geochemistry: (C. Agee and N. Muttik, *UNM*) EMPA. Diogenitic pyroxene $Fs_{23.8\pm1.7}Wo_{1.5\pm0.2}$, Fe/Mn=32±2, n=37, eucritic pyroxene $Fs_{44.4\pm7.3}Wo_{7.6\pm0.9}$, Fe/Mn=28±2, n=4, plagioclase $Or_{0.2\pm0.1}Ab_{7.0\pm0.0}An_{92.7\pm0.0}$, n=3, olivine $Fa_{30.2}$, Fe/Mn=45, n=1.
Classification: Achondrite (Howardite)
Specimens: 23.5 g including a probe mount on deposit at *UNM*, *Reed* holds the main mass.

Northwest Africa 8045 (NWA 8045)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (L5)
History: Purchased in Tuscon 2013.
Physical characteristics: Single stone, weathered exterior, saw cut reveals numerous chondrules with medium-grained metal/sulfide throughout, gray-brown groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a probe mount shows many well-defined, equilibrated chondrules. Ubiquitous kamacite, troilite, and plagioclase, accessory phosphate. Minor oxidation of metal, and a few small iron-oxide veinlets observed.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Olivine $Fa_{25.8\pm0.1}$, Fe/Mn=51±4, n=7; orthopyroxene $Fs_{21.4\pm0.6}Wo_{2.0\pm1.6}$, Fe/Mn=30±1, n=8.
Classification: Ordinary chondrite (L5), weathering grade W1.
Specimens: 26.1 g including a probe mount on deposit at *UNM*, *Jensen* holds the main mass.

Northwest Africa 8051 (NWA 8051)
(Northwest Africa)
Purchased: 2012 Oct
Classification: Ordinary chondrite (L5)
History: Purchased by Andreas Gren from a Moroccan dealer in October 2012.
Physical characteristics: Very fresh specimen (165 g). Mostly black with visible shiny, irregularly-shaped metal grains and bronze sulfides.
Petrography: (A. Irving and S. Kuehner, *UWS*) Sparse chondrules within a dark, fine grained matrix containing elongate, ragged grains of fresh metal and some sulfides.
Geochemistry: Olivine ($Fa_{24.7\text{-}25.0}$), orthopyroxene ($Fs_{19.7\text{-}20.4}Wo_{1.1\text{-}2.0}$), augite ($Fs_{6.6\text{-}8.8}Wo_{46.0\text{-}42.7}$).
Classification: Ordinary chondrite (L5, highly shocked).
Specimens: 22.3 g including one polished thin section at *UWB*. The remainder is held by *Gren*.

Northwest Africa 8054 (NWA 8054)
(Northwest Africa)
Purchased: 2013 Sep
Classification: Ungrouped achondrite
History: Four similar looking stones were found together between Smara and Tan Tan in southern Morocco. Adam Aaronson purchased the stones in Agadir in September 2013.
Physical characteristics: Four black stones lacking fusion crust (totaling 118 g).
Petrography: (A. Irving and S. Kuehner, *UWS*) Protogranular texture. Composed predominantly of magnesian orthopyroxene (with more ferroan rims), clinopyroxene, some magnesian olivine, minor intermediate plagioclase and Cr-troilite. Blebs of kamacite occur on grain boundaries and within mafic silicate grains.
Geochemistry: Olivine (cores $Fa_{4.0\text{-}4.2}$, rims $Fa_{2.2\text{-}2.9}$, Cr_2O_3 = 0.3 wt.%), orthopyroxene ($Fs_{1.1}Wo_{2.5}$), clinopyroxene ($Fs_{2.3\text{-}2.4}Wo_{35.6\text{-}36.1}$). Oxygen isotopes (K. Ziegler, *UNM*): analyses of acid-washed silicate material by laser fluorination gave, respectively: $\delta^{17}O$ = -1.599, -1.551; $\delta^{18}O$ = 0.341, 0.372; $\Delta^{17}O$ = -1.778, -1.747 (all per mil).
Classification: Achondrite (ungrouped).
Specimens: 20.1 g and one polished thin section are at *UWB*. The remainder is held by *Aaronson*.

Northwest Africa 8061 (NWA 8061)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (H3.10)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2013.
Physical characteristics: 21 fragments that fit together to form 3 matching stones. Weathered exterior, saw cuts on all fragments reveal the same reddish brown interior, with small chondrules visible.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows many distinct, porphyritic chondrules, most with glass or mesostasis, also some irregular shaped or fragmental chondrules. Apparent mean chondrule size 286±225 μm, median 200 μm, n=70. Some of the abundant iron metal appears to be oxidized a seen in the widespread oxide veining. Opaque matrix throughout. Accessory melilite, fassaite, sulfide, chromite.
Geochemistry: (C. Agee and N. Muttik, *UNM*) EMPA. Chondrule ferroan olivine $Fa_{14.9\pm6.2}$, Fe/Mn=46±24, Cr_2O_3=0.34±0.11 wt%, n=21; chondrule olivine range $Fa_{0.3\text{-}26.8}$, n=33; low Ca-pyroxene $Fs_{10.5\pm8.2}Wo_{1.7\pm1.7}$, Fe/Mn=25±25, n=24. (Karen Ziegler, *UNM*) Oxygen isotope values of 4 acid-washed aliquots of bulk sample, 1.3, 1.4, 1.4, 1.7 g, gave $\delta^{17}O$ = 3.676, 3.040, 3.434, 3.139, $\delta^{18}O$ = 5.521, 5.632, 6.320, 5.652, $\Delta^{17}O$ = 0.761, 0.066, 0.097, 0.155 (linearized, all permil).
Classification: Ordinary chondrite (H3.10). Type 3.10 is based on mean Cr_2O_3 content and sigma of ferroan olivine in porphyritic chondrules using the scheme of Grossman and Brearley (2005). The sigma of 0.11 is anomalously low compared to other 3.10 ordinary chondrites, and instead resembles the mean Cr_2O_3 and sigma of Colony, Y-81020 (CO3.1), and Acfer 094 (C2-ung). Weathering W2.
Specimens: 25.1 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 8062 (NWA 8062)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (LL6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2013.
Physical characteristics: Single stone, weathered fusion crust, saw cut reveals fine grained texture, gray-green, faint chondrules and scattered opaques.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows mostly indistinct, equilibrated chondrules, accessory kamacite, oxidized iron, troilite, chromite, augite, and with plagioclase up 100 μm.
Geochemistry: (C. Agee and N. Muttik, *UNM*) EMPA. Olivine $Fa_{32.0\pm0.7}$, Fe/Mn=64±4, n=8, Low Ca-pyroxene $Fs_{25.6\pm0.3}Wo_{2.1\pm0.1}$, Fe/Mn=40±3, n=6.
Classification: Ordinary chondrite (LL6), weathering grade (W2).
Specimens: 21.1 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 8063 (NWA 8063)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (H4)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2013.
Physical characteristics: Single stone, weathered exterior, many small chondrules and metal/sulfide grains set in a brown groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows distinct, porphyritic chondrules, many with mesostasis. Accessory kamacite, taenite, oxidized iron, and troilite.

Geochemistry: (C. Agee and N. Muttik, *UNM*) EMPA. Olivine $Fa_{18.6\pm1.5}$, Fe/Mn=38±4, n=19, Low Ca-pyroxene $Fs_{16.1\pm0.6}Wo_{1.3\pm0.2}$, Fe/Mn=22±1, n=16.
Classification: Ordinary chondrite (H4), weathering grade (W2).
Specimens: 37 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 8064 (NWA 8064)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (H6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2013.
Physical characteristics: Single stone, saw cut reveals fine grained texture, dark green-gray with scattered chondrules and fine-grained opaques.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows equilibrated chondrules, kamacite, oxidized iron and veins of iron oxide, troilite, with plagioclase up 75 μm.
Geochemistry: (C. Agee and N. Muttik, *UNM*) EMPA. Olivine $Fa_{19.9\pm0.3}$, Fe/Mn=41±2, n=11, Low Ca-pyroxene $Fs_{17.4\pm0.3}Wo_{1.3\pm0.2}$, Fe/Mn=24±1, n=12.
Classification: Ordinary chondrite (H6), weathering grade (W3).
Specimens: 55.7 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 8065 (NWA 8065)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (L6)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2013.
Physical characteristics: Single stone, saw cut reveals fine grained texture, dark gray with ubiquitous metal/sulfide.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows equilibrated chondrules, kamacite, taenite, oxidized iron, chromite and troilite (also finely disseminated), with plagioclase up 50 μm.
Geochemistry: (C. Agee and N. Muttik, *UNM*) EMPA. Olivine $Fa_{23.9\pm0.3}$, Fe/Mn=50±2, n=6, Low Ca-pyroxene $Fs_{20.2\pm0.2}Wo_{2.3\pm0.9}$, Fe/Mn=30±1, n=7.
Classification: Ordinary chondrite (L6), weathering grade (W2).
Specimens: 43 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 8066 (NWA 8066)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (H5)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2013.
Physical characteristics: Single stone, dark exterior, broken surface reveals fine grained, oxidized interior.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows distinct, equilibrated PO and BO chondrules, abundant kamacite, oxidized iron, troilite, and minor apatite.
Geochemistry: (C. Agee and N. Muttik, *UNM*) EMPA. Olivine $Fa_{18.4\pm0.7}$, Fe/Mn=39±2, n=18, Low Ca-pyroxene $Fs_{16.2\pm0.6}Wo_{120.1}$, Fe/Mn=23±1, n=13.
Classification: Ordinary chondrite (H5), weathering grade (W2).
Specimens: 120.1 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 8067 (NWA 8067)
Morocco
Purchased: 2013
Classification: Ordinary chondrite (H4)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification, 2013.
Physical characteristics: 129 matching stone fragments, weathered exterior with desert cement, saw cut reveals reddish brown interior, small chondrules visible.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows many distinct, porphyritic chondrules, most with mesostasis. Matrix is permeated with oxide veins. Accessory kamacite, oxidized iron, and troilite.
Geochemistry: (C. Agee and N. Muttik, *UNM*) EMPA. Olivine $Fa_{18.5\pm1.5}$, Fe/Mn=37±2, n=16, Low Ca-pyroxene $Fs_{15.7\pm2.5}Wo_{2.2\pm2.9}$, Fe/Mn=31±12, n=17.
Classification: Ordinary chondrite (H4), weathering grade (W3).
Specimens: 22.8 g including a probe mount on deposit at *UNM*, Sean Tutorow holds the main mass.

Northwest Africa 8114 (NWA 8114) 24°04'45.8''N, 14°47'12.4''W
Western Sahara
Found: Feb 2013
Classification: Martian meteorite (basaltic breccia)
History: Purchased from a Moroccan meteorite dealer, Mohammed Aid.
Physical characteristics: Fusion crusted stone, 1.8 cm length. The meteorite contains some terrestrial carbonate veining visible on the surface and in thin section. Some clasts also show through the fusion crust.
Petrography: The sample has a clastic texture with augite and pigeonite ($En_{32-69}Fs_{19-44}Wo_{1.5-38}$), predominantly andesine plagioclase but also K-rich feldspar ($An_{15-60}Ab_{38-76}Or_{1.8-10}$ and $Ab_{22-41}Or_{59-78}$), Cl-apatite and Ti-magnetite. These composition ranges are very similar to those reported by Agee et al. (2013) for pyroxene in NWA 7034. Like NWA 7034, the new sample contains zoned and rounded basaltic mineralogy and monomineralic (pyroxene, feldspar) clasts.
Geochemistry: (R. Greenwood, *OU*) Oxygen isotopes: $\delta^{17}O = 4.36$; $\delta^{18}O = 7.25$; $\Delta^{17}O = 0.59$ per mil. Although the $\delta^{18}O$ value is at the high end of the Agee et al. (2013) analyses of NWA 7034, both have similar (unique) $\Delta^{17}O$.
Classification: SNC, basaltic breccia, likely paired with NWA 7034.
Specimens: 1.9 g at *ULei*

Northwest Africa 8115 (NWA 8115)
(Northwest Africa)
Purchased: 2006 Mar
Classification: HED achondrite (Diogenite)
History: Purchased by F. Kuntz in March 2006 in St. Marie aux Mines, France.
Petrography: (A. Irving and S. Kuehner, *UWS*) Fresh, coarse-grained assemblage of predominantly orthopyroxene with accessory olivine, chromite and troilite and Ni-free metal.
Geochemistry: Olivine ($Fa_{32.6-35.6}$; FeO/MnO = 37-38), orthopyroxene ($Fs_{30.0-30.5}Wo_{1.8-1.4}$; FeO/MnO = 28).
Classification: Diogenite.
Specimens: Type specimen plus one polished thick section are at *PSF*; main mass with *Kuntz*.

Northwest Africa 8116 (NWA 8116)
(Northwest Africa)
Purchased: 2007
Classification: Martian meteorite (Shergottite)

History: Purchased in 2007 from Blaine Reed, who acquired the specimen from a Moroccan dealer.
Physical characteristics: A single small stone (0.48 g) with partial fusion crust.
Petrography: (A. Irving and S. Kuehner, *UWS*) Composed mainly of zoned clinopyroxene and plagioclase (maskelynite) with accessory ulvöspinel, ilmenite, pyrrhotite and K-rich glass. Ulvöspinel grains contain melt inclusions surrounded by radial fractures.
Geochemistry: Subcalcic augite ($Fs_{23.6\text{-}41.2}Wo_{33.2\text{-}27.0}$; FeO/MnO = 29-35), pigeonite ($Fs_{56.0\text{-}58.0}Wo_{14.6\text{-}13.9}$; FeO/MnO = 32-36).
Classification: Martian (shergottite). Paired with NWA 2975 and numerous paired stones.
Specimens: The entire specimen is held by *PSF*.

Northwest Africa 8117 (NWA 8117)
(Northwest Africa)
Purchased: 2013 May
Classification: HED achondrite (Eucrite)
History: Purchased by Alexandre Debienne in May 2013 from a dealer in Agadir, Morocco as a possible paired stone to NWA 7931.
Physical characteristics: A single small stone (2.41 g) lacking fusion crust.
Petrography: (A. Irving and S. Kuehner, *UWS*) Breccia consisting of numerous small mineral clasts in a finer matrix. Minerals are exsolved pigeonite, calcic plagioclase, silica polymorph, ilmenite and troilite.
Geochemistry: Host orthopyroxene ($Fs_{60.9\text{-}61.5}Wo_{2.1\text{-}2.0}$; FeO/MnO = 29-30), clinopyroxene exsolution lamellae ($Fs_{26.2\text{-}26.5}Wo_{43.1\text{-}44.0}$ FeO/MnO = 32).
Classification: Eucrite breccia.
Specimens: The entire stone is at *PSF*.

Northwest Africa 8125 (NWA 8125)
(Northwest Africa)
Purchased: 2013 Apr
Classification: Ordinary chondrite (H5)
History: Purchased by Sergey Vasiliev and Marc Jost from a dealer in Sidi Ifni, Morocco in April 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) Some small chondrules (0.4-1.1 mm, mean 0.7 mm) are present in a relatively coarse grained matrix.
Geochemistry: Olivine ($Fa_{18.4\text{-}18.9}$), orthopyroxene ($Fs_{15.8\text{-}16.2}Wo_{0.9\text{-}1.5}$), augite ($Fs_{5.9\text{-}7.2}Wo_{44.9\text{-}43.1}$).
Classification: Ordinary chondrite (H5).
Specimens: 24.6 g including one polished thin section at *UWB*. The remainder is held by Mr. S. Vasiliev and Mr. Marc Jost.

Northwest Africa 8140 (NWA 8140)
(Northwest Africa)
Purchased: 2013
Classification: Ordinary chondrite (L5)
History: One crusted stone weighing 92.45 g was found and purchased in Agadir in 2013. Greg Catterton acquired the sample from a meteorite prospector in 2013.
Physical characteristics: Dark brown shiny fusion crust fusion crust covers ~99% of the angular rounded stone.
Petrography: (A. Love, *App*): Sample is mottled orange and tan in color and displays indistinct chondrules in recrystallized chondritic matrix. Major mineral phases are olivine, orthopyroxene, plagioclase, apatite, kamacite, taenite, troilite, and chromite. Sample contains metal grains composed of unweathered and weathered irregular-shaped grains of FeNi and FeS.
Geochemistry: $Fa_{24.6\pm0.4}$, N=15, Low-Ca pyroxene $Fs_{23.5\pm0.5}Wo_{1.8\pm0.5}$, N=13.
Classification: Ordinary chondrite (L5, S2, W2)
Specimens: 20.43 g and 1 polished thin section are on deposit at *App*

Northwest Africa 8141 (NWA 8141)
(Northwest Africa)
Purchased: May 24, 2002
Classification: Ordinary chondrite (L3-6)
History: Edwin *Thompson* obtained the specimen from a Moroccan trader in February 2002 and donated it to *Cascadia* on May 24, 2005.
Physical characteristics: The specimen has lumps and pits and a dark shiny weathering patina.
Petrography: (K. Armstrong and A. Ruzicka, *Cascadia*) Brecciated chondritic texture, containing regions with distinct chondrules and opaque matrix, and clasts with granoblastic texture and moderately coarse feldspar (15 μm to 52 μm across). No chondrules are apparent in the largest granoblastic clast, consistent with type 6. Chondrule size is 0.65±0.23 mm (N=27). Metal and troilite abundance determined by pixel counting is 4 and 5 area%, respectively.
Geochemistry: Phase compositions are variable in areas with distinct chondritic texture and less variable in more granoblastic areas. Distinct chondritic texture: olivine $Fa_{21.1\pm10.1}$, Fe/Mn = 50.1±21.6 (N=29) and low-Ca pyroxene $Fs_{13.3\pm7.0}Wo_{1.1\pm1.1}$, Fe/Mn = 23.2±10.7 (N=15). Largest granoblastic clast: olivine $Fa_{25.3\pm0.6}$, Fe/Mn = 49.1±6.9 (N=9) and low-Ca pyroxene $Fs_{19.6\pm3.4}Wo_{2.0\pm1.3}$, Fe/Mn = 31.7±7.5 (N=12).
Classification: Textures, mineral compositions, and metal abundances are consistent with a L3-6 genomict breccia.
Specimens: A 42.6 g piece, polished thin section, small fragment, and butt are on deposit at *Cascadia*.

Northwest Africa 8142 (NWA 8142)
(Northwest Africa)
Purchased: 2010
Classification: Ordinary chondrite (L5, melt breccia)
History: Three mostly crusted stones weighing 12 g were found and purchased in Agadir in 2009. Greg Catterton acquired the sample from a meteorite prospector in 2010.
Physical characteristics: Black shiny fusion crust covers 95% of the rounded ellipsoidal stones. Fusion crusted surfaces display contraction cracks.
Petrography: (A. Love, *App*): Sample is light greenish-gray and displays a brecciated macro-texture composed of clasts of very fine-grained (<20 μm), porphyritic-textured melt embaying areas and clasts of recrystallized chondritic rock. Melt is composed of ~19 μm zoned and unzoned, euhedral olivine grains with 205-305 μm melted and partially melted olivine phenocrysts and 0.2 - 1.3 mm rounded nodules of cellular-textured FeNi and FeS set within a silicate glass. Chondritic rock is composed of: ~400 μm angular clasts of metamorphosed chondritic material, 300 μm mineral grains and few relict chondrules (~605 μm) set within a recrystallized matrix of clastic debris.
Geochemistry: Chondritic lithology $Fa_{23.5\pm0.9}$ (N=7), $Fs_{19.9\pm0.6}$ (N=6), $An_{12.2\pm2.0}$ (N=5). Unmelted phenocrysts $Fa_{24.3\pm0.7}$ (N=5). Microporphyry $Fa_{11.7\pm5.1}$ (N=18)
Classification: L5 Impact melt rock
Specimens: 2.4 g and 2 polished thin sections are on deposit at *App*

Northwest Africa 8143 (NWA 8143)
Morocco
Purchased: July 2013
Classification: Ordinary chondrite (LL3)
Petrography: (A. Rubin, *UCLA*) Chondrules are sharply defined, although they lack clear, transparent, colorless glassy mesostases. Much of the low-Ca pyroxene has polysynthetic twins and is thus low-Ca clinopyroxene. Olivine and low-Ca pyroxene are chemically heterogeneous. Chondrules have an average diameter of about 700 μm, indicating that the rock is LL and not H or L (which have much smaller chondrules).

Northwest Africa 8154 (NWA 8154)
(Northwest Africa)
Purchased: 2005
Classification: Iron meteorite (ungrouped)
History: The iron was purchased from Greg Hupé in 2005.
Petrography: Compositionally anomalous iron with an anomalous structure. Weathering is minor. Metal consists of tiny crystals, ~0.2 × 0.05 mm in size. There is no recognizable octahedral structure. A striking feature are the grape-like clusters of graphite ellipsoids ("graphite flowers") with long axes of 1.0 to 0.4 mm. In the ~13 cm^2 section are two circular troilites (0.8 and 1.0 mm long axis), a schreibersite needle 1.8 × 0.25 mm surrounded by thin kamacite and schreibersite around a cavity, probably originally filled with troilite.
Geochemistry: (J. T. Wasson, *UCLA*) Composition by INAA (Mean of two analyses): 4.74 mg/g Co, 133 mg/g Ni, 52.7 µg/g Ga, 218 µg/g Ge, 16.2 µg/g As, 24.4 µg/g Ir, and 1.57 µg/g Au. Has high Cu (559 µg/g) and Sb (604 ng/g).
Classification: This iron has no close relatives. The seven ungrouped irons with Ga in the range 46 to 57 µg/g have very different Ni and, with two exceptions, very different Co contents. The 15 ungrouped irons with Co contents in the range 4.52 to 4.94 mg/g all have very different Ni contents and, with the exception of Etosha, very different Ga contents.
Specimens: 113 g at *UCLA*.

Northwest Africa 8155 (NWA 8155)
(Northwest Africa)
Purchased: 2011
Classification: Iron meteorite (ungrouped)
History: The iron was purchased from Greg Hupé in 2005.
Petrography: This compositionally anomalous iron also has an anomalous structure. Metal consists of tiny crystals, ~0.2 × 0.05 mm in size. There is no recognizable octahedral structure. A striking feature are the grape-like clusters of graphite ellipsoids ("graphite flowers") with long axes of 1.0 to 0.4 mm. In the ~13 cm^2 section are two circular troilites (0.8 and 1.0 mm long axis), a schreibersite needle 1.8 × 0.25 mm surrounded by thin kamacite and schreibersite around a cavity, probably originally filled with troilite. Weathering is minor.
Geochemistry: (J. T. Wasson, *UCLA*) Composition by INAA: 4.75 mg/g Co, 133 mg/g Ni, 52.0 µg/g Ga, 218 µg/g Ge, 16.2 µg/g As, 24.4 µg/g Ir, and 1.57 µg/g Au. Has very high Cu (598 mg/g) and Sb (650 ng/g). Single analysis.
Classification: This iron is likely paired with NWA 8154. The structural and compositional properties are the same within the uncertainties.
Specimens: 27.2 g at *UCLA*.

Northwest Africa 8156 (NWA 8156)
(Northwest Africa)
Purchased: 2011
Classification: Iron meteorite (IVA)
History: The iron was purchased from a Russian meteorite dealer at the Tucson mineral show in 2011.
Petrography: Finest octahedrite, bandwidth 1.8±0.3, just below the Off-Of boundary. Relatively unweathered; hint of heat-altered zone. Small schreibersite crystals at intersection of kamacite bands. Some 0.4-0.3 mm rectangular crystals, currently unidentified; these may be oxides.
Geochemistry: (J. T. Wasson, *UCLA*) Composition by INAA: 4.32 mg/g Co, 123 mg/g Ni, 1.9 µg/g Ga, <12 µg/g Ge, 15.7 µg/g As, 0.456 µg/g Ir, and 2.87 µg/g Au. It is the high-Au end member of group IVA; it has the highest observed Au, As and Ni and the second highest Co, 1% lower than that in Kharga (reportedly found on the other side of the Sahara).
Specimens: 66.6 g at *UCLA*

Northwest Africa 8157 (NWA 8157)
(Northwest Africa)
Purchased: Sept 2011
Classification: Carbonaceous chondrite (CM2)
Physical characteristics: Single stone with a fresh-looking fusion crust.
Petrography: (R.H. Hewins, C. Göpel, O. Boudouma, B. Zanda, *MNHNP*) Microprobe and SEM examination of a polished mount shows a highly altered, brecciated rock with clasts of CM2 material and with very few recognizable chondrules. It consists of fine-grained phyllosilicate-rich matrix containing serpentine, cronstedtite and PCP aggregates. The matrix is clastic and patchy with localized clusters of PCP. There are Type IA, IAB and IB (magnesian PO, POP, PP) chondrules, with fairly fresh olivine and pyroxene but altered metal, and one Al-rich chondrule, with unaltered Al-diopside phenocrysts and groundmass replaced by cronstedtite blades. The chondrite matrix consists of highly varied patches containing serpentine, cronstedtite and PCP intergrowths. There are abundant magnesian olivine crystal clasts in the matrix. Type II chondrules (ferroan) are represented only by ferroan olivine crystal clasts in the matrix. Refractory inclusions were not recognized. Fe-Ni sulfide, chromite and calcite are seen in minor quantities in the matrix. Kamacite survives only as rare droplets encased in Type I olivine phenocrysts.
Geochemistry: (R.H. Hewins, C. Göpel, O. Boudouma, B. Zanda) Olivine is $Fa_{1.2\pm0.6}$, n=13, with 0.35 wt% Cr_2O_3 0.26 wt% CaO, and $Fa_{26.9\pm6.7}$, n=6, with FeO/MnO=101±14 and 0.35±0.20wt% Cr_2O_3. Pyroxene is $En_{97.6\pm0.4}Fs_{1.3\pm0.31}Wo_{1.1\pm0.1}$ n=5 and $En_{61.6\pm6.5}Fs_{1.6\pm0.1}Wo_{36.7\pm6.4}$ n=3. Kamacite contains about 6 wt% Ni and 0.3 wt% Co. Oxygen isotopes (N. Assayag and P. Cartigny, *IPGP*): two determinations gave, respectively, $\delta^{18}O$ = 3.811±0.009, 5.811±0.016; $\delta^{17}O$ = -2.446±0.040, -0.601±0.026; $\Delta^{17}O$= -4.441,-3.663 (all per mil). Chromium isotopes (C. Göpel, *IPGP*) The bulk rock is characterized by its ^{54}Cr excess: the $\delta^{54}Cr$ value (1.006 ± 0.180) falls within the range (0.87- 1.13) defined by CB-CM chondrites (Shukolyukov and Lugmair, 2006; Yamashita et al., 2010; Trinquier et al., 2007; Rotaru et al., 1992).
Classification: CM2 chondrite.

Northwest Africa 8158 (NWA 8158)
(Northwest Africa)
Purchased: May 2011
Classification: HED achondrite (Eucrite)
Physical characteristics: One stone covered with fresh fusion crust.
Petrography: (R.H. Hewins, *MNHNP*) Contains pigeonite, and minor augite, each with fine exsolution lamellae of the other (in the larger grains). Texturally heterogeneous (ophitic-granoblastic), and in grain size, perhaps a recrystallized breccia. Contains anorthite, rare tridymite needles, and three Fe oxide minerals, chromite, ulvöspinel and ilmenite.
Geochemistry: (R.H. Hewins, *MNHNP*) Pyroxene is pigeonite from ~ $En_{44}Fs_{44}Wo_{12}$ to ~ $En_{19}Fs_{61}Wo_{20}$ (n=84), and is not well equilibrated. There are rare augite grains $En_{28}Fs_{32\text{-}38}Wo_{33\text{-}40.}$ The FeO/MnO of pigeonite is 32.2, s.d. 2.5. Plagioclase is $An_{95\pm0.3}$, n=18. Oxides are $Sp_{16}Cr_{61}Usp_{21}Mgt_2$, $Sp_4Cr_1Usp_{91}Mgt_4$ and $Ilm_{100}Hem_0$. Oxygen isotopes (N. Assayag and P. Cartigny, *IPGP*): two determinations gave delta $\delta^{18}O$ = 3.022±0.063; $\Delta^{17}O$ = -0.236±0.044 (per mil).
Classification: (R.H. Hewins, *MNHNP*, N. Assayag and P. Cartigny *IPGP*) Achondrite (eucrite). Typical eucrite textures, mineral compositions, and oxygen isotopic compositions.

Northwest Africa 8159 (NWA 8159)
Morocco
Purchased: 2013
Classification: Martian (augite basalt)
History: Purchased by Brahim Tahiri from a Moroccan hunter and sent to his partner Sean Tutorow for classification in 2013.

Physical characteristics: Single stone, weathered exterior with yellow-brown patina, light colored desert soil coating on one side. Saw cut reveals a very fine-grained, gray-green interior, with a few small melt veins present, but one vein was up to 1 mm thick, lithology offsets at vein boundaries suggest slight brecciation.
Petrography: (C. Agee, *UNM*) Microprobe examination of a two polished mounts shows intergranular texture with approximately 50% augite, 40% plagioclase and maskelynite, 5% olivine. Augites have equant habits 10-200 µm with igneous zoning. Some augite crystals are rimmed with Fs-rich orthopyroxene. Plagioclase with shock-fractured prismatic laths up to 500 × 100 µm, but many are smaller (~50 × 10 µm), approximately half of the plagioclase has been converted to maskelynite, and is observed as unfractured, glassy casts. Olivine ~100 µm, most with resorbed or coronal grain boundaries. Ubiquitous magnetite, most grains 10-100 µm. Minor ilmenite, merrillite, Cl-apatite, and Cr-spinel. Trace calcite and barite assumed to be desert weathering products.
Geochemistry: (C. Agee, N. Muttik, F. McCubbin, *UNM*) EMPA. Augite $Fs_{38.6\pm11}Wo_{30.4\pm11.0}$, Fe/Mn=36±4, n=78; orthopyroxene rims $Fs_{62.3\pm5.9}Wo_{0.6\pm0.3}$, Fe/Mn=23±3, n=6; plagioclase $An_{58.2\pm2.3}Ab_{41.5\pm2.4}Or_{0.3\pm0.2}$, n=7; maskelynite $An_{58.1\pm1.8}Ab_{41.6\pm1.7}Or_{0.2\pm0.0}$, n=5; olivine $Fa_{66.2\pm3.8}$, Fe/Mn=50±5, n=15; large shock melt vein (mean value from EMPA with 20 µm beam) SiO_2=46.14±0.94, TiO_2=0.67±0.09, Al_2O_3=10.63±1.22, Cr_2O_3=0.14±0.02, FeO=24.89±1.92, MnO=0.50±0.04, MgO=4.02±0.39, CaO=9.10±0.38, Na_2O=1.80±0.17, P_2O_5=0.29±0.03, Cl=0.067±0.022 (all wt%), n=10. (Karen Ziegler, *UNM*) Oxygen isotope values of 5 acid-washed aliquots of bulk sample, 1.2, 1.2, 1.8, 2.0, 1.0 mg, gave $\delta^{17}O$ = 2.406, 2.405, 2.093, 2.532, 2.329, $\delta^{18}O$ = 4.089, 3.947, 3.328, 4.197, 3.880, $\Delta^{17}O$ = 0.247, 0.321, 0.336, 0.316, 0.280 (linearized, all permil).
Classification: Martian (augite basalt). This is a martian meteorite based on oxygen isotopes, Fe/Mn of augite and olivine, and An-content of plagioclase and maskelynite. This martian meteorite is a fine grained olivine-bearing augite basalt that does not appear to be a SNC type although there are some aspects of it that resemble SNC. The augite and olivine compositions and crystallization trends are similar to nahklites, in particular MIL 03346. It does not resemble most shergottites in that pigeonite is absent, and orthopyroxene is only a minor phase present as Fe-rich rims on some augite grains, however plagioclase compositions are similar to shergottites, in particular the low potassium labradorites in QUE 94201. Shock pressures appear to have been lower than for shergottites, perhaps similar to Chassigny and some nakhlites, as only about half the plagioclase has been transformed to maskelynite. Magnetite is the dominant oxide phase in this meteorite, the only other martian meteorite that shares this aspect is basaltic breccia NWA 7034 and its pairings.
Specimens: 24.57 g including a two probe mounts on deposit at *UNM*, *Reed* holds 2.21 g, Sean Tutorow holds the main mass.

Northwest Africa 8160 (NWA 8160)
Morocco
Purchased: 2013
Classification: Carbonaceous chondrite (CV3)
History: Purchased by Blaine Reed and Steve Arnold (of Arkansas) at the Denver Gem and Mineral Show, September 2013.
Physical characteristics: Many fragments, saw cut face reveals classic CV3 appearance with numerous chondrules up to 5 mm set in dark brown matrix, scattered CAIs up to 1 cm.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows primarily porphyritic chondrules in abundant very fine-grained matrix.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Olivine range $Fa_{0.6\text{-}45.3}$, n=28; Type I chondrule olivine $Fa_{1.1\pm0.4}$, Cr_2O_3=0.18±0.06 wt%, n=12; ferroan chondrule olivine $Fa_{9.0\pm10.0}$, Fe/Mn=77±37, Cr_2O_3=0.14±0.17 wt%, n=16; low-Ca pyroxene $Fs_{2.7\pm2.5}Wo_{2.4\pm2.6}$, n=13; clinopyroxene $Fs_{4.2\pm1.2}Wo_{13.9\pm1.5}$, n=3.
Classification: Carbonaceous chondrite (CV3), weathering grade W2.

Specimens: 28 g including a probe mount on deposit at *UNM*, *Reed* holds ~3600 g, Arnold holds ~1700 g.

Northwest Africa 8161 (NWA 8161)
Morocco
Purchased: 2013
Classification: Martian meteorite (Shergottite)
History: Purchased by Aziz Habibi in Morocco, 2013.
Physical characteristics: Several fragments that fit together to form a nearly complete stone. Shiny black crust, broken surface reveals polycrystalline texture with millimeter-sized grains
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished epoxy mount shows ~40% olivine, ~40% pyroxene, ~10% maskelynite, ubiquitous Cr-Ti-Fe oxides; sulfide present. Pyroxenes and olivines are heavily shocked, grain size ranges from 200-2000 μm.
Geochemistry: (C. Agee and N. Muttik, *UNM*) EMPA. Olivine $Fa_{40.1\pm3.7}$, Fe/Mn=52±1, n=12; pigeonite $Fs_{28.6\pm2.7}Wo_{9.7\pm2.7}$, Fe/Mn=30±1, n=23; augite $Fs_{19.4\pm1.9}Wo_{32.0\pm4.4}$, Fe/Mn=27±1, n=9; maskelynite $Or_{2.3\pm0.4}Ab_{47.2\pm3.0}An_{50.5\pm3.2}$, n=8.
Classification: Martian meteorite (shergottite, poikilitic)
Specimens: 20.5 g including microprobe mount on deposit *UNM*, Aziz Habibi holds the main mass.

Northwest Africa 8162 (NWA 8162)
Morocco
Purchased: 2013
Classification: HED achondrite (Eucrite, monomict)
History: Purchased by Blaine Reed from Eegooblago Meteorites at the Denver Gem and Mineral Show, 2013.
Physical characteristics: Single stone, desert-weathered exterior; saw cut reveals breccia with large light-colored clasts bounded by numerous dark-colored veins.
Petrography: Microprobe examination of a polished mount shows ~50% pyroxene and ~35% plagioclase, most in subophitic clasts, some in cataclastic zones, and ~15% shock-melt veins throughout. Accessory silica, chromite, and ilmenite. Minor zircon. Most pyroxenes with exsolution lamellae.
Geochemistry: (C. Agee and N. Muttik, *UNM*) EMPA. Low-Ca pyroxene $Fs_{61.0\pm1.5}Wo_{3.0\pm1.1}$, Fe/Mn=32±1, n=17; high-Ca pyroxene $Fs_{34.8\pm10.0}Wo_{34.3\pm11.6}$, Fe/Mn=33±1, n=8; plagioclase $Or_{0.6\pm0.2}Ab_{10.2\pm1.5}An_{89.2\pm1.4}$, n=3.
Classification: Achondrite (Eucrite-mmict) Equilibrated basaltic eucrite; shock-melt brecciation throughout.
Specimens: 24.2 g including a probe mount on deposit at *UNM*, *Reed* holds the main mass.

Northwest Africa 8163 (NWA 8163)
Northwest Africa
Purchased: 2006
Classification: Ordinary chondrite (H4)
History: A single stone weighing 35.7 g was found and purchased in Morocco in 2006. Thomas Webb acquired the sample from a meteorite prospector in 2006.
Physical characteristics: The stone has a flattened tabular shape, is light orange and lacks fusion crust.
Petrography: (A. Love and L. Morris, *App*) The specimen has a chondritic texture composed of well-defined chondrules, several irregular-shaped 3 mm macrochondrules and several lithic clasts set within a recrystallized matrix. Chondrules are well-formed, distinct and have an average diameter of 538 μm.
Classification: Ordinary Chondrite (H4, S1, W2)
Specimens: 7.5 g and 1 polished thin section are on deposit at *App*

Northwest Africa 8164 (NWA 8164)

(Northwest Africa)
Purchased: Oct 2013
Classification: Carbonaceous chondrite (CK6)
History: Bought by Michael Farmer in October 2013 from a meteorite dealer in Morocco.
Physical characteristics: Single, 62.0 g bullet-shaped stone with weathered fusion crust. Sawn surface dominated by asparagus-green olivine.
Petrography: (L. Garvie, *ASU*) Coarse-grained recrystallized matrix. Scattered large chondrules (mainly 200 to 800 μm, one to 2 mm), commonly mantled by opaques. Mineralogy dominated by olivine, pyroxene with a wide range of compositions, plagioclase, and Cr-rich magnetite, and minor Ca-Cl phosphate and Fe-rich Ni sulfide. Plagioclase to 150 μm. Most sulfides weathered.
Geochemistry: Olivine $Fa_{30.6\pm0.2}$, NiO=0.48±0.07, FeO/MnO=108.2±14, n=6. Pyroxenes - low Ca pyx $Fs_{25.6\pm0.2}Wo_{0.6\pm0.2}$, n=2; pigeonite $Fs_{24.0}Wo_{6.7}$; augite $Fs_{13.7\pm3.1}Wo_{32.9\pm9.2}$, n=2; and diopside $Fs_{8.4}Wo_{47.4.}$ Magnetite Cr_2O_3=4.1±0.1 wt% and NiO=0.27±0.02 wt%, n=2.
Classification: Carbonaceous chondrite CK6. Moderately weathered.
Specimens: 13.5 g and polished mount at *ASU*. Fredric Stephan holds the main mass.

Nothing 34°31’13.93"N, 113°20’8.93"W
Arizona, USA
Found: 2010
Classification: Iron meteorite (IID)
History: In 2010, a gold prospector with a metal detector located an iron mass buried about 60 cm below the surface, 4.5 km north of Nothing, Arizona. The finder sold most of the mass (3.3 kg) in 2012 at a natural history auction, where it was purchased by K.D. Jenkerson.
Physical characteristics: Flattened, rusty mass covered in caliche. Interior relatively fresh.
Petrography: (L. Garvie, *ASU*) Etched sections display well-developed medium Widmanstätten pattern, with average bandwidth of 0.8 mm. Kamacite lamellae straight to swollen, with rounded ends where they abut against other lamellae. Kamacite displays abundant Neumann bands. Taenite and plessite cover about 45% by area; dark etching plessite predominates, comb and net plessite also present. Schreibersite occurs as abundant 0.5 to 3 μm inclusions in kamacite, as elongated skeletal crystals enveloped in swathing kamacite, and as uncommon lamellae. Only one (3 × 2 mm) troilite nodule observed.
Geochemistry: (J.T. Wasson, *UCLA*) Composition by INAA: 6.63 mg/g Co, 101.3 mg/g Ni, 295 μg/g Cu, 75.3 μg/g Ga, 4.92 μg/g As, 16.1 μg/g Ir, 20.2 μg/g Pt, and 0.628 μg/g Au. The Nothing meteorite is distinct from the other two IID irons from the southwestern US, Wallapai (3.99 μg/g Ir and 1.533 μg/g Au) and Needles (5.37 μg/g Ir and 1.404 μg/g Au). Its nearest relative is Carbo (14.3 μg/g Ir), but Nothing is compositionally well resolved.
Classification: Iron, IID
Specimens: 120.83 g at *ASU*

O’Malley 020 30°34’21.7"S, 131°28’51.4"E
South Australia, Australia
Found: 14 Apr 2010
Classification: Ordinary chondrite (H4)
History: Single piece found by K. Bell on the Nullarbor Plain.
Physical characteristics: Single stone lacking fusion crust.
Petrography: (A. Tomkins, *Monash*) Well-defined chondrules (to 1.5 mm) in an optically opaque matrix. Chondrule mesostases very finely recrystalized (<1 μm). Plagioclase to <5 μm in some chondrules. Chondrule types include RP, POP, PP, BO, PO and rare devitrified glass chondrules. Fe-Ni metal grains are almost completely destroyed by weathering, whereas troilite grains are largely intact. The weathering has generated a fine network of iron oxides within the matrix. Most olivine grains show sharp optical extinction, although some have undulose extinction.

Geochemistry: (A. Tomkins, *Monash*) Microprobe analyses show that pyroxene composition are variable; from a small number of analyses olivine appears uniform: olivine $Fa_{19.7\text{-}20.5}$, mean=20.2 mol%, std=0.28, n=6; Low-Ca pyroxene $Fs_{16.4\text{-}19.9}$, mean=17.9 mol%, std=1.50, n=4.
Classification: Ordinary chondrite (H3, S2, W4). The type 4 classification is based on the optically opaque matrix and very fine scale of glass recrystallization.

Ouadangou 12.9° N, 0.08° E
Gnagna, Burkina Faso
Fell: November 2003
Classification: Ordinary chondrite (L5)
History: In November of 2003, Michael Farmer traveled to Burkina Faso to purchase meteorites. During his visit he heard of a recent fall near the town of Bilanga. Mr. Farmer bought ~1.6 kg of the new fall in Bilanga, then traveled to the fall site ~40 km NNW to the villages of Batiawo and Lampiaiyre (several km SE of Oudangou). Here he purchased the remaining 2.84 kg of stones. According to the villagers of Batiawo and Lampyaire, the stones fell within the villages and surrounding bushland, during the afternoon in early November 2003, though the exact date could not be agreed upon. Several of the stones from Batiawo had been broken into pieces by villagers. The largest stone (broken into three pieces) is 2031 g.
Physical characteristics: All stones are well-rounded showing broad, poorly developed regmaglypts, and covered by a velvety fusion crust up to 0.5 mm thick. The few reddish patches on the exterior are from the local soil. Interior is primarily white, with heterogeneous distribution of gray clasts. Clasts to 5 cm, rounded, some with scalloped margins. A few large metal-troilite nodules, to 1.5 cm. Sparse shock veining. None of the stones show signs of rusting.
Petrography: (L. Garvie, ASU) Matrix largely recrystallized with disseminated plagioclase grains <50 μm, rarely to 200 μm. Scattering of distinct chondrules, some to 1 mm, including RP, PO, and BO. Localized melting forming silicate-metal-sulfide pods. Two 1 cm^2 sections show ~10 Cu grains each. Cu grains (<50 μm across) occur at metal/sulfide boundaries, and associated as a complex taenite-troilite-copper assemblage. Troilite grains show a range of pressure effects from undistorted and monocrystalline, to those with undulose extinction and a few exhibiting spindle-like twin lamellae. Chromite grains extensively fractured. Range of achondritic clast types, from dark and fine-grained to light colored with a sugary texture. Two of the light-colored clasts contain white veins. Clasts largely metal-troilite free, medium-grained, some vuggy with euhedral crystals.
Geochemistry: Olivine $Fa_{24.6\pm0.3}$, range 24.1 to 25.3, FeO/MnO=48.3±3.3, n=13. Two grains P-rich, with P_2O_5 to 0.11 wt%. Low Ca pyroxene $Fs_{20.2\pm0.2}$, range 20.2 to 20.6, $Wo_{1.4\pm0.1}$, range 1.2 to 1.6, n=7.
Specimens: 197 g at *ASU*.

Ramlat as Sahmah 429 (RaS 429) 20°2.528'N, 56°28.296'E
Al Wusta, Oman
Found: 2011 Jan 22
Classification: Ordinary chondrite (LL3-6)
Petrography: Breccia consisting of clasts ranging in petrographic grade from 3 to 6. Mean chondrule size ~1 mm.
Geochemistry: Total range of fayalite content in olivine $Fa_{13.0\text{-}32.8}$, but fayalite-rich olivine in clasts with petrographic grade 5 and 6 is homogeneous with mean $Fa_{28.6\pm1.8}$ (n=18). $Fa_{28.6\pm1.8}$ (n=18) in equilibrated clasts

Retuerta del Bullaque 39°27'32"N, 4°22'39"W
Castilla-La Mancha, Spain
Found: 1980
Classification: Iron meteorite (IAB-MG)

History: The specimen was discovered by Faustino Asensio López in 1980 at an agricultural farmland where he often worked with his father. The iron was found about 1.5 km from Retuerta del Bullaque, Ciudad Real, Spain, close to the northern boundary of Cabañeros National Park. The finder recognized the unusual density of the rock and found no crater. For more than fifteen years the meteorite remained on the family home patio, and later was used as a weight for the ham-curing process. Mr. Asensio López suspected an extraterrestrial origin of the specimen when he watched a TV news report on the sighting of a meteor over Spain on February 28, 2011, so later that year he contacted Juan C. Gutiérrez-Marco (*CSIC-IGE*) and Rafael P. Lozano (*IGME*) to check the authenticity of the specimen.
Physical characteristics: One mass of about 100 kg and average dimensions of 45 × 31 × 20 cm. Irregular but somewhat rectangular shape, with many concave surface features. The original surface shows moderate terrestrial weathering.
Petrography: (R.P. Lozano, *IGME*; J.C. Gutiérrez-Marco, *CSIC-IGE*). Two etched sections (77.7 and 41.1 cm^2) show a Widmanstätten pattern (bandwidth: 2.0 ± 0.3 mm), with abundant cohenite lamellae (9.5% of total area), irregularly bordered by accessory schreibersite and enveloped in swathing kamacite. Taenite is present in 0.02-0.3 mm thick lamellae along kamacite and between kamacite bands (0.3-4 mm max. size pearlitic plessite). There are abundant kamacite grains showing polygonal sectors, with conspicuous Neumann lines and without cohenite. The larger sections display eight irregularly shaped graphite-FeS nodules (max. size, 5-12 mm), located in the central areas of the kamacite polygonal sectors. Each of the nodules has a 1-3 mm-thick rim of schreibersite + cohenite.
Geochemistry: (Jesús Reyes, *IGME*). Bulk composition: Ni = 7.527, Co = 0.475 (ICP-AES data, in wt%). Ga = 68.9, Ge = 365, As = 13.7, W = 0.95, Ir = 1.95, Au = 1.695 (ICP-MS data, in ppm).
Classification: (R.P. Lozano, *IGME*). Iron meteorite, coarse octahedrite, IAB complex (MG), cohenite rich, moderate weathering.
Specimens: A 1278 g type specimen, two fragments of 388 and 50 g, and three polished sections at *IGME*. The finder, F. Asensio López, and his brothers hold the main mass of about 98 kg.

Rosamond 34°49.676'N, 118°8.784'W
Kern County, California, United States
Found: 2012 June 9
Classification: Ordinary chondrite (LL3)
History: Found by Robert Verish on June 9, 2012, while he was searching for meteorites in an empty lot on the outskirts of the town of Rosamond.
Physical characteristics: Yellowish-brown tabular-shaped, weathered fragment of a chondritic stone. Through a thin, patchy relict fusion-crust, large chondrules which were flattened and are in a preferred-orientation, could be discerned easily with a hand-lens.
Petrography: (A. Rubin, *UCLA*): The rock has large chondrules, averaging about 600 μm in diameter, consistent with LL chondrites. The rock has a pronounced petrofabric.
Geochemistry: $Fa_{13.5\pm11.0}$ (n=4), range $Fa_{0.7\text{-}25.0}$; $Fs_{15.7\pm12.1}Wo_{0.8\pm0.6}$ (n=16), range $Fs_{1.6\text{-}31.7}$; the low-Ca pyroxene Fs distribution has a broad peak between Fs_{23} and Fs_{32}, consistent with a low petrologic grade LL chondrite.
Specimens: 3.45 g type specimen at *UCLA*; main mass with ***Verish.***

Sayh al Uhaymir 559 (SaU 559) 20°33.046'N, 56°39.336'E
Al Wusta, Oman
Found: Nov 2005
Classification: Ureilite
History: During November 2005, John Blennert found a 107 g meteorite in the desert of Oman.
Physical characteristics: Exterior of the stone is rough, with preferential (wind?) ablation of the pyroxene over olivine grains. Difficult to cut, requiring seven diamond blades and one week to slice the stone in half. Surface of the polished thin section is rough.

Petrography: (L. Garvie, ASU) Typical ureilite dominated by roughly equal proportions of anhedral, fine- to medium-grained (0.5 to 1 mm) olivine and pyroxene. No graphite visible in the thin section. Extensive reduction of the olivine. Diamond abundant and confirmed by powder X-ray diffraction. Diamond clusters to 20 μm visible with a reflected-light microscope. Interstitial metal mostly altered to iron oxides.
Geochemistry: Olivine and pyroxene more reduced than in typical ureilites. Olivine cores have $Fa_{5.2\pm0.1}$, FeO/MnO = 11.5±0.7, Cr_2O_3 to 0.5 wt%, CaO to 0.3 wt%, n=13, rims to $Fa_{0.5}$. Low-Ca pyroxene cores $Fs_{4.7\pm0.1}Wo_{4.89\pm0.04}$, n=7.
Classification: Ureilite.
Specimens: 32 g and one thin section at *ASU*.

Sayh al Uhaymir 560 (SaU 560) 20°59.03'N, 57°19.11'E
Al Wusta, Oman
Purchased: 2006
Classification: Ordinary chondrite (H6)
History: Found in Oman in 2006.
Physical characteristics: Single stone, rough, dark weathered exterior, polished saw cuts reveal many small chondrules set in a brown groundmass.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished mount shows numerous densely packed PO, POP chondrules, abundant oxidized Fe-metal in matrix.
Geochemistry: (C. Agee and L. Burkemper, *UNM*) Olivine $Fa_{18.8\pm0.2}$, Fe/Mn=38±2, n=23; low-Ca pyroxene $Fs_{16.6\pm0.2}Wo_{1.2\pm0.2}$, Fe/Mn=22±1, n=16.
Classification: Ordinary chondrite (H6), weathering grade W3.
Specimens: 39.2 g including a probe mount on deposit at *UNM*, *Reed* holds the main mass.

Sayh al Uhaymir 561 (SaU 561) 20°16'11.0"N, 56°38'41.1"E
Al Wusta, Oman
Found: Jan 2011
Classification: Ordinary chondrite (L6)
Petrography: (P. Strickland, *UAb*) Approximately 20 vol% chondrules, 75 vol% matrix, and <1 vol% metal. Chondrules have an average diameter of 0.8 mm and display RP and PO - POP textures. Most olivine and pyroxene grains have irregular and planar fractures, strong undulatory extinction, and clinoenstatite lamellae on some low-Ca pyroxene indicating moderate shock (S4).
Geochemistry: (C. Herd and P. Strickland, *UAb*) Olivine $Fa_{24.9\pm0.9}$ (n=43); Low-Ca Pyroxene $Fs_{21.4\pm1.2}Wo_{1.6\pm0.3}$ (n=23).
Specimens: 59.3 g type specimen, including polished thin section, are on deposit at *UAb*. Main mass, including 2 thin sections, at *SQU*.

Sayh al Uhaymir 562 (SaU 562) 20°59'30.02"N, 57°11'48.33"E
Al Wusta, Oman
Found: 17 Apr 2008
Classification: HED achondrite (Eucrite, unbrecciated)
Physical characteristics: (L Garvie, *ASU*) Single stone. Lacks fusion crust. Sawn surface shows medium-grained mosaic of approximately equal proportions of anhedral to bladed, white plagioclase (to 3 mm) and honey-brown, anhedral, granular pyroxene (to 1.5 mm) crystals.
Petrography: (Andrew Foreman, Ryan Ziegler, *WUSL*) The meteorite consists of feldspar and exsolved pyroxene phenocrysts. Very minor olivine present. Accessories include silica, chromite, and ilmenite. Troilite blebs fill some annealed shock fractures within plagioclase. Pigeonite is the original igneous pyroxene, which has subsequently exsolved augite, with parallel exsolution lamellae ranging from very fine (sub-μm to 2 μm width) to coarse (5 μm). Plagioclase 0.5 to 3 mm, and pyroxene 0.5 to 1.5 mm.

Geochemistry: (Andrew Foreman, Ryan Ziegler, *WUSL*) Feldspar $An_{87.3\text{-}88.9}Ab_{10.6\text{-}12.2}$; augite $Fs_{47.6\text{-}35.5}Wo_{22.5\text{-}32.3}$, Fe/Mn=27.8-35.6; pigeonite $Fs_{62.7\text{-}51.3}Wo_{4.6\text{-}14.6}$, Fe/Mn=25.7-33.5; olivine $Fa_{75.7}$, Fe/Mn=51.5. INAA of an 84-mg sample gives 20.8% FeO, Sc 25 ppm, Co 4.4 ppm, La 0.87 ppm, Sm 0.93 ppm, Eu 0.54 ppm, and Yb 1.6 ppm. Sr 130±30 ppm, which is very low for a meteorite from Oman.
Specimens: 20.1 g *ASU*

Sayh al Uhaymir 563 (SaU 563) 20°1'32.8"N, 56°39'41.9"E
Al Wusta, Oman
Found: 2009 Oct
Classification: Ureilite
Physical characteristics: A single dark oriented stone.
Petrography: (J. Gattacceca, *CEREGE*) Consists mostly of millimeter-sized euhedral olivine and pyroxene. Coarse-grained equigranular texture with triple junctions. Olivine shows reduced margins. Metal weathering products are present along grain boundaries. Metal is present as micrometer-sized blebs in the silicates close to grain boundaries. Carbon (graphite or diamond) is present in elongate clusters up to 500 µm.
Geochemistry: Olivine cores $Fa_{15.4\pm2.0}$, FeO/MnO=29.8. Olivine CaO 0.36 wt.%, Cr_2O_3=0.99 wt.%. Pigeonite $Fs_{13.2\pm0.1}$ $Wo_{7.5\pm0.3}$.
Classification: Ureilite. Strong weathering.
Specimens: 26.4 g and a polished section at *CEREGE*. Main mass with *Kuntz*.

Sayh al Uhaymir 566 (SaU 566) 20.175°N, 56.511°E
Al Wusta, Oman
Found: 2011 Feb
Classification: Carbonaceous chondrite (CV3)
History: Found by an anonymous prospector in February 2013.
Petrography: (A. Irving and S. Kuehner, *UWS*) PO chondrules (0.7-1.8 mm, some rimmed) and sparse very fine grained CAI in deep brown, altered matrix.
Geochemistry: Olivine ($Fa_{0.4\text{-}11.2}$), orthopyroxene ($Fs_{1.4\text{-}35.0}Wo_{0.8\text{-}3.1}$), subcalcic augite ($Fs_{15.1}Wo_{32.0}$), augite ($Fs_{2.6}Wo_{41.6}$).
Classification: Carbonaceous chondrite (CV3).
Specimens: Type specimen plus one polished thin section at *PSF*; main mass with anonymous collector.

Slaton (b) 33.4336, -101.7498
Lubbock County, Texas, United States
Found: 1940s
Classification: Iron meteorite (IIAB)
History: The meteorite was found at Cade Farm on Union Rd., west of Slaton, Texas, by H.M. Cade reportedly sometime in the 1940s when he was plowing his cotton field. This comes from the same farm and was found by the same person as the L4 chondrite Slaton, which now takes on the synonym Slaton (a). Mr. Cade would always challenge his grandchildren to see if they could pick up this meteorite. It sat on Mr. Cade's fireplace mantel until his death and was eventually passed down to his grandson. Frank Carroll purchased the meteorite from the grandson in August, 2013.
Physical characteristics: Single iron mass, approximately 20 × 15 × 8 cm, with a centered, large rounded depression, oxidized exterior with some exfoliation; saw cut reveals bright metallic interior with a few small weathering cracks or oxidized grain boundaries.
Petrography: (C. Agee, *UNM*) This iron meteorite consists primarily of kamacite (~99%) with minor amounts of schreibersite and taenite. Schreibersite frequently occurs as isolated en echelon rhabdites 10-200 µm wide, up to ~1 mm long. Most taenite occurs as isolated skeletal inclusions 10-200 µm wide, up to 1 mm long, within host kamacite. No troilite or silicates observed. Etched surface on 60 × 30 mm slice shows kamacite bands with apparent widths 2-6 mm, abundant Neumann lines.

Geochemistry: (C. Agee, *UNM*) Bulk composition, ICPMS: Ni 5.7 wt%, Co 0.40 wt%, Cu 88 ppm, W 180 ppm, Ga 370 ppm, Ge 84 ppm, As 12.5 ppm, Ir 21 ppm, Au 1.3 ppm. Kamacite, EMPA, focused beam: Fe 94.3±1.8 wt%, Ni 6.1±0.4 wt%, Co 0.48±0.03 wt%, W 340±170 ppm, Cu <100 ppm, Ga 570±100 ppm, Ge <100 ppm, n=16.
Classification: Iron meteorite (IIAB). Coarsest octahedrite.
Specimens: 24 g on deposit at *UNM*, Frank Carroll holds the main mass.

Stewart Valley 017 (StV 017) 36°14.465'N, 116°11.218'W
Nye County, Nevada, United States
Found: 2006 Oct 21
Classification: Ordinary chondrite (L6)
History: The 6th and 7th finds of more than two dozen freshly fusion-crusted, whole individual L6 chondrites, forming an overlapping strewn-field.
Physical characteristics: Two freshly fusion-crusted fragments that physically pair to form a whole individual.

Timber Lake 45.425°N, 101.097°W
South Dakota, USA
Found: 2011 May
Classification: Ordinary chondrite (H3)
History: Found by Mr. Richard Scherer in 2010 while he was checking part of a farm field that appeared to have been dug out by a badger. The find location is about 1.85 km west of Timber Lake in Dewey County, South Dakota.
Physical characteristics: A single, dense, dark brown stone weighing 8660 g.
Petrography: (A. Irving and S. Kuehner, *UWS*) Well-formed, small chondrules and fairly abundant altered metal. Minerals are olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, troilite and kamacite (partially altered to iron hydroxides).
Geochemistry: Olivine ($Fa_{14.6\text{-}44.2}$; median Fa_{18}, N = 12; Cr_2O_3 in ferroan olivine = 0.02-0.12 wt.%, mean 0.05 wt.%, sd 0.04 wt.%, N = 8), orthopyroxene ($Fs_{16.1\text{-}18.2}Wo_{1.11.7}$; core $Fs_{6.9}Wo_{4.6}$), augite ($Fs_{6.0}Wo_{45.6}$), pigeonite ($Fs_{45.3}Wo_{9.5}$).
Classification: Ordinary chondrite (H3).
Specimens: A total of 20.9 g of sample and one polished thin section are on deposit at *UWB*. The main mass is held by *RScherer*.

Tongan 24°32'21"N, 110°59'6"E
Guangxi, China
Found: 1996
Classification: Iron meteorite (IAB-MG)
History: A large iron meteorite was found by a farmer in his field in Miaobei village, Zhongshan County, in 1996, and then purchased by Mr. Yongxing Liang, a retired official in Zhongshan county, Guangxi Province, in 2001. The find site is near the boundary with Zhongshan county.
Physical characteristics: This meteorite was not weighed accurately and is estimated to be about 500 kg. It is dark brown in color due to a thin layer of limonite and has an angular shape without any fusion crust. Surface covered with abundant centimeter-sized cavities.
Petrography: (B. Miao, H. Chen, Z. Xia, L. Xie, *GUT*; Y. Lin, *IGGCAS*): The meteorite is dominated by kamacite with a bandwidth of 10.5 mm on average. Taenite occurs as thin lamellae 30-100 μm wide. Kamacite (5.59-7.59 wt% Ni; 0.96-1.29 wt% Co) and taenite (17.9-34.0 wt% Ni; 0.33-0.88 wt% Co).
Geochemistry: (K.V. Ponganis, *UCSD*; B. Spettel, *MPI*) Bulk composition (by INAA): Fe 91.9%, Ni 6.60%, Co 4330 mg/g, Ga 88.6 μg/g, Ge 301 μg/g, As 11.9 μg/g, Mo 8.20 μg/g, Ir 2.34 μg/g.
Classification: Iron (IAB-MG)
Specimens: 150 g of the sample is on deposit at *GUT* and 200 g at *IGGCAS*.

Watson 013 30°34’30.0"S, 131°30’5.9"E
South Australia, Australia
Found: 14 Apr 2010
Classification: Ordinary chondrite (H3)
History: Single piece found by A. Tomkins on the Nullarbor Plain.
Petrography: (A. Tomkins, *Monash*) Well-defined chondrules (most <1 mm, some to 2 mm) in a highly porous light-colored transparent matrix; there is no matrix glass. Plagioclase to 20 μm. Chondrule types include RP, POP, PP, BO and PO; there are rare very finely recrystallized glassy chondrules. Chondrule mesostases finely recrystallized (<1 μm). The porosity is variable, being more porous in zones where <5% of metal is rusted, less porous in domains where metal is >20% rusted. Fe-Ni metal grains (10-15%) are variably irregular and approximately twice as abundant as troilite, with which they are occasionally conjoined. Most conjoined metal-troilite grains have sharp contacts, and there are rare domains of troilite in metal with adjacent Cu metal. Olivine grains show sharp extinction.
Geochemistry: (A. Tomkins, *Monash*) Microprobe analyses show that olivine and pyroxene compositions are highly heteorgeneous: olivine $Fa_{18.6\text{-}28.1}$, mean=20.7 mol%, std=4.1, n=5; Low-Ca pyroxene $Fs_{9.3\text{-}17.9}$, mean=15.7 mol%, std=3.2, n=5; $Wo_{0.6\text{-}4.0.}$ Average compositions are most consistent with a H chondrite designation.
Classification: Ordinary chondrite (H3, S2, W1). The type 3 classification is based on the heterogeneity of olivine and pyroxene compositions; the glass recrystallization implies upper type 3.

Willcox Playa 010 32°08’54.5"N, 109°52’25.2"W
Cochise County, Arizona, United States
Found: 25 June 2006
Classification: Primitive achondrite (Lodranite)
History: The 22.3 g stone was found on the Willcox Playa by Jason Utas while hunting for meteorites with Peter Utas.
Physical characteristics: The stone resembles a triangular flattened disk and is complete and oriented stone prior to the removal of the type specimen. Weathered fusion crust is present on all sides. The trailing face retains a frothy lip of fusion crust 4-6 mm wide and 1-2 mm thick.
Petrography: (J. Utas and A. Rubin, *UCLA*) The stone is comprised of 0.5-1.2 mm (avg. ~0.7 mm) orthopyroxene, olivine and Ca-rich clinopyroxene grains ($Fs_{5.7\pm0.5}$ $Wo_{21.9\pm0.6}$; (n=6). Ni-poor kamacite and terrestrial oxides are also present (~25% total volume), in addition to minor amounts of troilite and Ni-bearing schreibersite. Pyroxene grains exhibit abundant crystallographically controlled exsolved Ni-poor metallic Fe. No plagioclase was observed. The stone’s composition and lack of plagioclase indicate that it is a highly reduced member of the acapuolcoite/lodranite clan. Its coarse texture and the extent of reduction indicate that it is a lodranite. The lack of plagioclase, Cr-diopside and rare Cr-bearing minerals show that the rock is not a winonaite.

Williams 38.843°N, 86.620°W
Lawrence County, Indiana, United States
Found: 2012 Oct
Classification: Ordinary chondrite (H4)
History: Found by Mr. Douglas May in October 2012 while he was tilling his garden. The find location was 3 miles east of Williams in Lawrence County, Indiana.
Physical characteristics: A single brownish stone weighing 1030 g.
Petrography: (A. Irving and S. Kuehner, *UWS*) The specimen consists of small, well-formed chondrules in a finer grained matrix rich in stained metal. Primary minerals are olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, merrillite, chlorapatite, troilite and kamacite (partially altered to iron hydroxides).
Geochemistry: Olivine ($Fa_{18.9\text{-}19.0}$), orthopyroxene ($Fs_{16.9\text{-}17.0}Wo_{1.2\text{-}1.3}$), clinopyroxene ($Fs_{5.2\text{-}5.3}Wo_{46.7\text{-}46.9}$).

Classification: Ordinary chondrite (H4).
Specimens: A total of 20.2 g of sample and one polished thin section are on deposit at *UWB*. The main mass is held by Mr. D. May.

Winner 43.3637137, -99.9197665
Tripp County, South Dakota, USA
Found: Aug 2004
Classification: Ordinary chondrite (L3.9)
History: In August 2004, Chris Novotney was getting off his tractor to unhook a hay rake and get gas when he noticed a rusty rock, which he collected: it was eventually identified as a meteorite. The rock stayed in the possession of Mr. Novotney until he sold it to KD Meteorites in 2013.
Physical characteristics: Single stone, exterior partially covered by dark weathered fusion crust, some oxidation, saw cut reveals numerous chondrules and clasts of variable size and color (white, green, and gray), some up to several mm, medium grained metal/sulfide throughout.
Petrography: (C. Agee, *UNM*) Microprobe examination of a probe mount shows many well-defined porphyritic and BO chondrules, with coarsely recrystallized mesostasis and plagioclase. Ubiquitous kamacite, taenite, troilite, and chromite. Some iron-oxide veinlets.
Geochemistry: (C. Agee and N. Muttik, *UNM*) Olivine $Fa_{26.0\pm2.7}$, Fe/Mn=50±6, n=10; orthopyroxene $Fs_{21.7\pm0.8}Wo_{1.4\pm0.2}$, Fe/Mn=30±2, n=5, clinopyroxene $Fs_{10.1\pm1.8}Wo_{44.3\pm1.0}$, Fe/Mn=29±1, n=2.
Classification: Ordinary chondrite (L3.9), weathering grade W2.
Specimens: 32.1 g including a probe mount on deposit at *UNM*, the finder Chris Novotney holds 20 g, *ASU* holds 7.8 g, KD Meteorites holds the main mass.

Xining 36°51’35.7"N, 101°25’33.70"E
QingHai, China
Fell: 11 Feb 2012
Classification: Ordinary chondrite (L5)
History: On February 11, 2012, at 13:30-14:00, the villagers of Xining heard a loud noise. Shortly thereafter villagers recovered around 10 stones in Huangzhong county, Xining city of Qinghai Province. Miao Buikui and Liu Xijun, *GUT*, heard the news of the fall and visited the fall site. The total weight of the fall is more than 100 kg. The largest meteorite is 17.3 kg and second is 12.5 kg. The two meteorites were bought from the villagers by meteorite lovers. The meteorite fall area is a ellipse including the villages of Baina, Small Sigou, Yehong, Heergai, and Baiya. The area is 20-30 km in length and 4-5 km in width oriented NNE, centered at 36°51'35.77"N, 101°25’33.70"E.
Physical characteristics: Most stones have a similar appearance with a blocky shape: corners are not well-rounded. Where orientation is present, it is poorly developed. Many stones covered by a velvety fusion crust up to 1.0 mm thick. Interior is primarily white or grayish. A few tiny metal-troilite nodules and sparse shock veining. None of the stones show signs of rusting.
Petrography: (B. Miao, H. Chen, Z. Xia, L. Xie, J. Yao, *GUT*): The meteorite has a typical chondritic texture. The matrix displays a moderate to high degree of recrystallization. Most plagioclase grains are 5-40 μm, with a few grains >50 μm in diameter. The degree of shock metamorphism and terrestrial weathering are S3 and W0, respectively.
Geochemistry: Chemical compositions of olivine and low-Ca pyroxene are homogeneous: olivine, $Fa_{24.7-25.2}$, mean $Fa_{24.9}$, PMD 0.64%; low-Ca pyroxene, $Fs_{21.3-21.9}En_{77.6-78.2}Wo_{0.46-0.57}$, mean $Fs_{21.5}En_{78.6}Wo_{0.46}$, PMD-Fs=0.84%. The content of Fe-Ni metal and troilite is 20.9 wt.%.
Classification: Based on the textural characteristics, metal abundance, chemical composition of silicate and thermal metamorphic characteristics, the meteorite is an L5 ordinary chondrite.
Specimens: 96.4 g at *GUT*.

Yucca 015 34°49.182’N, 114°16.566’W
Mohave County, Arizona, United States

Found: 14 Nov 2011
Classification: Ordinary chondrite (H metal)
History: This specimen was found by Jim Wooddell on the end of a small desert bench using a metal detector. It was buried approximately 1.25 cm below the surface.
Physical characteristics: Elongate metallic specimen with distinct roll-over lip and flow lines.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished surface shows 95% kamacite, with about 5% of H5 silicate minerals olivine, pyroxene, and albitic plagioclase. No taenite detected.
Geochemistry: (C. Agee and N. Wilson, *UNM*) Kamacite (EMPA) Fe=94.3±0.8, Ni=5.71±0.06, Co=0.34±0.01 wt%, n=13; olivine $Fa_{19.6\pm1.3}$, Fe/Mn=41±3, n=2; low-Ca pyroxene $Fs_{17.6\pm0.6}Wo_{1.5\pm0.1}$, Fe/Mn=24±1, n=2. INAA (Activation Laboratories): Cr = 0.242, Co = 5.22, Ni = 54.8 mg/g; Cu = 220, As = 19, Re = 0.04, Ir = 0.137, Au = 1.16, Ga <1, Ge <10 µg/g.
Classification: H-metal.
Specimens: Specimen is on deposit at *UNM*.

Yucca 016 34°49.595'N, 114°16.658'W
Mohave County, Arizona, USA
Found: 14 Nov 2011
Classification: Ordinary chondrite (H5)
History: Found by Jim Wooddell in a meteorite search area.
Physical characteristics: Dark reddish brown exterior. A saw cut reveals dark-brown matrix with light-colored patches, very fine metal/sulfide, a single light-colored chondrule 5 mm diameter.
Petrography: (C. Agee, *UNM*) Microprobe examination shows olivine, pyroxene, a few plagioclase, abundant kamacite, some fine oxidized weathering veins. POP and BO chondrules some with mesostasis, most 50-500 µm.
Geochemistry: (C. Agee and N. Wilson, *UNM*) (EMPA) Olivine $Fa_{18.3\pm0.9}$, Fe/Mn=39±4, n=21; low-Ca pyroxene $Fs_{16.6\pm0.7}Wo_{1.2\pm0.3}$, Fe/Mn=23±1, n=19; high-Ca pyroxene $Fs_{10.7}Wo_{43.5}$, Fe/Mn=31; plagioclase $Ab_{79.9}An_{13.7}Or_{6.4.}$
Classification: Ordinary chondrite (H5), weathering grade W2.
Specimens: 21.2 g plus thin section on deposit at *UNM*.

Yucca 017 34°49.154'N, 114°16.641'W
Mohave County, Arizona, USA
Found: 24 Nov 2011
Classification: Ordinary chondrite (H5)
History: Found by Jim Wooddell on the surface of a desert bench.
Physical characteristics: Dozens of stones. A saw cut reveals a fine grained and evenly distributed mix of dark silicate groundmass and Fe-Ni metal.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished thin section shows olivine, pyroxene (some zoned with orthopyroxene cores and augite rims), albitic plagioclase, chromite, merrillite, few BO chondrules. Kamacite makes up approximately 40% of this meteorite, minor taenite also observed.
Geochemistry: (C. Agee and N. Wilson, *UNM*) Olivine $Fa_{18.1\pm0.4}$, Fe/Mn=39±2, n=9, low-Ca pyroxene $Fs_{16.3\pm0.2}Wo_{1.3\pm0.2}$, Fe/Mn=23±1, n=11, augite $Fs_{5.4\pm0.1}Wo_{47.0\pm0.1}$, Fe/Mn=16±2 n=2.
Classification: Ordinary chondrite (H5), weathering grade W1.
Specimens: 21.6 g plus a thin section on deposit at *UNM*, Jim Wooddell holds the main mass.

Yucca 027 34°47.992'N, 114°16.021'W
Arizona, USA
Found: 11 Nov 2011
Classification: Ordinary chondrite (H metal)
History: Located with a metal detector 3" below surface by Wendy Wooddell.

Physical characteristics: Single metallic specimen.
Petrography: (C. Agee, *UNM*) Microprobe examination of a polished surface shows ~90% kamacite, ~10% taenite. No silicates present.
Geochemistry: (EMPA, C. Agee and L. Burkemper, *UNM*) Kamacite Fe=91.98±0.61, Ni=7.18±0.28, Co=0.45±0.02wt%, n=12; taenite Fe=69.12±1.71, Ni=30.10±1.71, Co=0.13±0.03wt%, n=7. INAA (Activation Laboratories) Ni=54.8, Co=4.5 (mg/g); Cr=19, Cu=239, Ga=33, As=10.5, Re=1.25, Ir=5.5, Pt=11.6, Au=2.2 (all µg/g); Ge, Sb, and W below detection limits (<10, <20, and <10 µg/g, respectively).
Classification: H-metal
Specimens: Specimen is on deposit at *UNM*.

Yucca 028 34.838°N, 114.290°W
Arizona, USA
Found: 2011 Nov 24
Classification: Ordinary chondrite (H6)
History: Found by Jim Wooddell on Nov. 24, 2011, while he was prospecting for meteorites.
Physical characteristics: Small, uncrusted 0.8 g stone.
Petrography: (A. Irving and S. Kuehner, *UWS*) Extensively recrystallized with rare partial chondrules and fairly abundant altered kamacite. Composed of olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, troilite, altered kamacite, merrillite and chlorapatite.
Geochemistry: Olivine ($Fa_{18.0\text{-}18.1}$), orthopyroxene ($Fs_{16.1\text{-}16.2}Wo_{1.0\text{-}1.3}$), clinopyroxene ($Fs_{5.3\text{-}6.3}Wo_{46.5\text{-}45.2}$).
Classification: Ordinary chondrite (H6).
Specimens: One 0.8 g stone (now polished for analysis) is at *UWB*.

Yucca 029 34.787°N, 114.248°W
Mohave County, Arizona, USA
Found: 2011 Dec 14
Classification: Ordinary chondrite (H3)
History: Found by Jim Wooddell on Dec. 14, 2011, while he was prospecting for meteorites.
Physical characteristics: A single stone with glossy, weathered fusion crust (60.4 g).
Petrography: (A. Irving and S. Kuehner, *UWS*) Unequilibrated specimen composed of small (0.2-0.5 mm), well-formed chondrules in a fine-grained matrix rich in altered kamacite. Most chondrules contain relatively ferroan mafic silicates, but some are very magnesian. Composed of olivine, orthopyroxene, clinopyroxene, sodic plagioclase, chromite, troilite, altered kamacite, and merrillite.
Geochemistry: Olivine ($Fa_{1.5\text{-}33.1}$, n = 9; Cr_2O_3 in ferroan olivine = 0.02-0.09 wt.%, n = 7), orthopyroxene ($Fs_{0.9\text{-}17.5}Wo_{0.8\text{-}1.1}$), subcalcic augite ($Fs_{13.3}Wo_{31.8}$).
Classification: Ordinary chondrite (H3.6). Subtype estimated from histograms of Cr_2O_3 distribution in ferroan olivine given in Figure 4 of Grossman and Brearley (2005).
Specimens: The main mass (46 g) is at *ASU*; 10 g and one polished thin section are at *UWB*. The remaining material is held by Mr. J. Wooddell.

3. ***Bibliography***

Agee C.B., Wilson N.V., McCubbin F.M., Ziegler K., Polyak V.J., Sharp Z.D., Asmerom Y., Nunn M.H., Shaheen R., Thiemens M.H., Steele A., Fogel M.L., Bowden R., Glamoclija M., Zhang Z., and Elardo S.M. (2013) Unique meteorite from Early Amazonian Mars: water-rich basaltic breccia Northwest Africa 7034. Science 1228858, Published online 3 January 2013 DOI:10.1126/science.1228858] (link)

Greenwood R.C., Franchi I.A., Gibson J.M. and Benedix G.K. (2012) Oxygen isotope variation in primitive achondrites: The influence of primordial, asteroidal and terrestrial processes. *Geochim. Cosmochim. Acta* **94**, 146-163. (link)

Grossman J.N. and Brearley A.J. (2005) The onset of metamorphism in ordinary and carbonaceous chondrites. *Meteorit. Planet. Sci.* **40**, 87-122. (link)

Mahajan R.R. and Murty S.V.S. (2012) Katol meteorite shower. *PLANEX Newsletter: Planet. Sci. Expl. Prog.* **2**, 16-19 (link)

Smith, D.G.W. (1997) The Ferintosh, Alberta, L6 Chondrite. *Journal of the Royal Astronomical Society of Canada* **91**, 121-126. (link)

Yamakawa A., Yamashita K., Makishima A., and Nakamura E. (2010) Chromium isotope systematics of achondrites: chronology and isotopic heterogeneity of the inner Solar System bodies. *Astrophys. J.* **720**, 150–154 (link)

4. Alphabetical listing of all meteorites

Name	abbrev	country	date	mass	class
Agoudal		Morocco	2000	>100 kg	Iron, IIAB
Aksai Chin		China	19 July 2012	2400	H5
Allan Hills 10910	ALH 10910	Antarctica	2010	444.1	L5
Allan Hills 10911	ALH 10911	Antarctica	2010	218.9	L6
Allan Hills 10912	ALH 10912	Antarctica	2010	60.3	H6
Antelope		United States	May 2012	754	H4
Argan 001		China	2012 Nov 18	136.7	H4
Argan 002		China	2012 Nov 18	88.6	L5
Ariah Park		Australia	1932	7250	Iron, IIIAB
Biduna Blowhole 004		Australia	6 Apr 2011	114.5	H5
Bou Kra 002		Western Sahara	27 Sep 2010	606	L5
Bou Kra 003		Western Sahara	27 Sep 2010	50	L6
Bou Kra 004		Western Sahara	2010 Sep 25	272.75	Eucrite-mmict
Bou Kra 005		Western Sahara	2010 Sep 28	31.14	CM2
Boumdeid (2003)		Mauritania	24 Sept 2003	190	L6
Boumdeid (2011)		Mauritania	14 Sept 2011	3599	L6
Braunschweig		Germany	2013 Apr 23	1300	L6
Buckley Island 10930	BUC 10930	Antarctica	2010	374.5	L6
Buckley Island 10932	BUC 10932	Antarctica	2010	879.9	L6
Buckley Island 10933	BUC 10933	Antarctica	2010	486	CR2
Buckley Island 10934	BUC 10934	Antarctica	2010	472.2	L6
Buckley Island 10935	BUC 10935	Antarctica	2010	362.4	L6
Buckley Island 10936	BUC 10936	Antarctica	2010	335.2	L5
Buckley Island 10937	BUC 10937	Antarctica	2010	234.6	L6
Buckley Island 10938	BUC 10938	Antarctica	2010	288	L5
Buckley Island 10939	BUC 10939	Antarctica	2010	143.9	L6
Buckley Island 10940	BUC 10940	Antarctica	2010	161.7	H6
Buckley Island 10941	BUC 10941	Antarctica	2010	118.8	L6

Buckley Island 10942	BUC 10942	Antarctica	2010	95.4	L6
Buckley Island 10945	BUC 10945	Antarctica	2010	80.3	H6
Buckley Island 10946	BUC 10946	Antarctica	2010	28.3	L5
Buckley Island 10947	BUC 10947	Antarctica	2010	47.2	H5
Buckley Island 10948	BUC 10948	Antarctica	2010	41.6	L6
Buckley Island 10949	BUC 10949	Antarctica	2010	22.6	L6
Buckley Island 10950	BUC 10950	Antarctica	2010	10.3	H6
Buckley Island 10951	BUC 10951	Antarctica	2010	26.1	L6
Buckley Island 10952	BUC 10952	Antarctica	2010	5.8	L6
Buckley Island 10953	BUC 10953	Antarctica	2010	7.9	H4
Buckley Island 10954	BUC 10954	Antarctica	2010	22.7	L6
Buckley Island 10955	BUC 10955	Antarctica	2010	15.1	L6
Buckley Island 10956	BUC 10956	Antarctica	2010	20.4	H5
Buckley Island 10957	BUC 10957	Antarctica	2010	4.9	L6
Buffalo Valley		United States	2011 Dec 29	21.5	H5
Burns		United States	July 2003	18400	Iron, IIIAB
Caleta el Cobre 020		Chile	2011 Oct 27	633	H5
Caleta el Cobre 021		Chile	2011 Oct 28	37.3	L4
Catalina 005		Chile	2010 Oct 20	228	H4
Catalina 006		Chile	2010 Oct 20	19.5	H5/6
Catalina 007		Chile	2010 Oct 20	11.9	H4
Catalina 008		Chile	2011 Jul 3	98	CO3
Catalina 009		Chile	2012 Feb	5.2	CR2
Catalina 010		Chile	2010 Feb 16	329	L5
Catalina 011		Chile	2010 Feb 17	573	H5
Catalina 012		Chile	2010 Mar 5	225	H6
Catalina 013		Chile	2010 Mar 6	428	H4
Catalina 014		Chile	2010 Mar 6	191	H4
Catalina 015		Chile	2009 Dec 10	239	L5
Catalina 016		Chile	2010 Sep 12	647	H4
Catalina 017		Chile	2010 Oct 1	426	H5
Catalina 018		Chile	2010 Feb 7	1018	L6
Catalina 019		Chile	2010 Mar 3	3191	H4
Catalina 020		Chile	2010 Oct 24	2084	L6
Catalina 021		Chile	2009 Dec 13	320	H3
Catalina 022		Chile	2009 Dec 12	77	L3
Catalina 023		Chile	2009 Dec 12	53.5	H6
Catalina 024		Chile	2009 Dec 18	312	H4
Catalina 025		Chile	2009 Dec 18	39	L6
Catalina 026		Chile	2009 Dec 19	845	H5
Catalina 027		Chile	2010 Mar 7	2408	L6
Catalina 028		Chile	2010 Apr 15	4993	H5
Catalina 029		Chile	2010 Jul 4	169	H5
Catalina 030		Chile	2010 Dec 6	214	H5

Catalina 031	Chile	2010 Dec 7	1178	L6
Catalina 032	Chile	2010 Dec 7	1107	H4
Catalina 033	Chile	2010 Dec 7	211	L6
Catalina 034	Chile	2010 Feb 09	20	LL5
Catalina 035	Chile	2011 Jul 2	904	H5
Catalina 036	Chile	2011 Jul 4	42	H5
Catalina 037	Chile	5 Jul 2010	2219	Ureilite
Catalina 038	Chile	2012 Feb	332	H5
Catalina 039	Chile	2009 Dec	135	H5/6
Catalina 040	Chile	2009 Dec	73	H6
Catalina 041	Chile	2010 Dec	27.1	H5
Catalina 042	Chile	2009 Dec	291	H5
Catalina 043	Chile	2009 Dec	252	H5
Catalina 044	Chile	2009 Dec	300	H5
Catalina 045	Chile	2010 Feb 8	29	LL5
Catalina 046	Chile	2010 Feb 10	17.1	LL6
Catalina 047	Chile	2010 Feb 10	237	H6
Catalina 048	Chile	2010 Feb 7	97	LL5
Catalina 049	Chile	2010 Feb 7	117	LL5
Catalina 050	Chile	2010 Feb 7	23	LL5
Catalina 051	Chile	2010 Mar 19	3470	H6
Catalina 052	Chile	2009 Dec 12	295	L6
Catalina 053	Chile	2009 Dec 17	692	H4
Catalina 054	Chile	2009 Dec 19	1016	L6
Catalina 055	Chile	2010 Apr 16	2405	H6
Catalina 056	Chile	2010 Apr 16	65.4	LL6
Catalina 057	Chile	2009 Nov 11	355	H6
Catalina 058	Chile	2009 Nov	374	H6
Catalina 059	Chile	2009 Dec 19	1906	H5
Catalina 060	Chile	2010 Feb 10	30	H6
Catalina 061	Chile	2010 Dec 6	364	LL6
Catalina 062	Chile	2010 Sep 30	775	H5
Catalina 063	Chile	2009 Dec 13	287	L6
Catalina 064	Chile	2009 Dec 10	2730	L6
Catalina 065	Chile	2009 Dec 19	268	H4
Catalina 066	Chile	2009 Dec 11	5356	L6
Catalina 067	Chile	2012 Feb	20.5	H4
Catalina 068	Chile	2009 Dec	314	H4
Catalina 069	Chile	2009 Dec	436	L4
Catalina 070	Chile	2012 Feb	3	H6
Catalina 071	Chile	2010 Sep 12	122	LL5
Catalina 072	Chile	2010 Jul 4	3794	L6
Catalina 073	Chile	2009 Dec 12	178	H4
Catalina 074	Chile	2012 Feb	127	H5-6

Catalina 075		Chile	2010 Feb 7	208	H5
Catalina 076		Chile	2010 Dec 6	5349	L6
Catalina 077		Chile	2009 Dec 13	1465	L5/6
Catalina 078		Chile	2010 Mar 06	1458	L3
Catalina 079		Chile	2010 Feb 9	4.4	Mesosiderite-B
Catalina 080		Chile	2012 Jul	448	H6
Catalina 081		Chile	2010 Feb 10	12241	H5
Catalina 082		Chile	2010 Feb 10	258	H6
Catalina 083		Chile	2011 Jun 23	236	L6
Catalina 084		Chile	2009 Dec	110	H3-5
Chelyabinsk		Russia	15 Feb 2013	>100 kg	LL5
Choteau		United States	P 2011	8474	Pallasite, ungrouped
Colachi 001		Chile	2012 Dec 12	81	LL6
Dar al Gani 1046	DaG 1046	Libya	2005 Sep	460	Eucrite-mmict
Dar al Gani 1062	DaG 1062	Libya	2008 Nov	1288	Eucrite-pmict
Dar al Gani 1063	DaG 1063	Libya	2002 May 27	410.3	CV3
Dhofar 698	Dho 698	Oman	13 Dec 2001	268	H4
Dhofar 1559	Dho 1559	Oman	2009 Apr 6	2466	H6
Dhofar 1622	Dho 1622	Oman	2009 May 6	474	CO3
Dhofar 1641	Dho 1641	Oman	2009 Oct 8	390	CO3
Dhofar 1674	Dho 1674	Oman	2010 Nov 21	49.2	Martian (shergottite)
Dhofar 1709	Dho 1709	Oman	Feb 2010	159	LL4
Dhofar 1717	Dho 1717	Oman	Feb 2010	211	L3
Dhofar 1725	Dho 1725	Oman	1 Dec 2011	263	L5
Dhofar 1733	Dho 1733	Oman	14 Dec 2011	7700	L3
Dhofar 1734	Dho 1734	Oman	14 Jul 2001	279.03	CV3
Dhofar 1735	Dho 1735	Oman	14 Jul 2001	48.92	Ureilite
Dhofar 1736	Dho 1736	Oman	18 Jul 2001	387.63	L3
Dhofar 1753	Dho 1753	Oman	Feb/Mar 2011	21.5	LL7
Dhofar 1754	Dho 1754	Oman	2001 May 2	580	Howardite
Dhofar 1757	Dho 1757	Oman	Jan 2011	68.5	H6
Dhofar 1758	Dho 1758	Oman	Jan 2011	278.4	H4-6
Dhofar 1759	Dho 1759	Oman	Jan 2011	250.3	H4
Dhofar 1760	Dho 1760	Oman	Jan 2011	1149.5	H6
Dhofar 1761	Dho 1761	Oman	2010 Nov 27	78	H4
Dhofar 1766	Dho 1766	Oman	2011 Dec 9	292	Lunar (feldsp. breccia)
Dhofar 1767	Dho 1767	Oman	2013 Jan	40	Howardite
Dhofar 1770	Dho 1770	Oman	Jan 2013	338	L5
Dhofar 1771	Dho 1771	Oman	Jan 2013	1120	H5
Dhofar 1772	Dho 1772	Oman	Jan 2013	1210	L4
Dhofar 1773	Dho 1773	Oman	Jan 2013	358	H5
Dhofar 1774	Dho 1774	Oman	Jan 2013	220	H6
Dhofar 1775	Dho 1775	Oman	Jan 2013	465	L6
Dhofar 1776	Dho 1776	Oman	Jan 2013	445	H6

Dhofar 1777	Dho 1777	Oman	Jan 2013	535	L6
Dhofar 1778	Dho 1778	Oman	Jan 2013	460	L4
Dhofar 1779	Dho 1779	Oman	Jan 2013	340	LL6
Dhofar 1780	Dho 1780	Oman	Jan 2013	55	LL5
Dhofar 1781	Dho 1781	Oman	Jan 2013	250	L6
Dhofar 1782	Dho 1782	Oman	Jan 2013	895	H4
Dhofar 1783	Dho 1783	Oman	2013	9850	H6
Diamond Valley 002	DV 002	United States	14 May 2011	61.2	H6
Diamond Valley 003	DV 003	United States	16 May 2011	89.5	H6
Domeyko		Chile	2000	13880	Iron, IIIAB
Dominion Range 10001	DOM 10001	Antarctica	2010	3343.2	H6
Dominion Range 10002	DOM 10002	Antarctica	2010	1621.5	LL5
Dominion Range 10003	DOM 10003	Antarctica	2010	1104.2	LL5
Dominion Range 10004	DOM 10004	Antarctica	2010	898.5	L5
Dominion Range 10005	DOM 10005	Antarctica	2010	1083.3	LL6
Dominion Range 10006	DOM 10006	Antarctica	2010	821.7	LL5
Dominion Range 10011	DOM 10011	Antarctica	2010	22.9	H6
Dominion Range 10012	DOM 10012	Antarctica	2010	44.2	L5
Dominion Range 10014	DOM 10014	Antarctica	2010	43.8	LL5
Dominion Range 10015	DOM 10015	Antarctica	2010	45.1	LL6
Dominion Range 10016	DOM 10016	Antarctica	2010	58.7	LL5
Dominion Range 10017	DOM 10017	Antarctica	2010	36.6	LL5
Dominion Range 10018	DOM 10018	Antarctica	2010	31.6	L6
Dominion Range 10019	DOM 10019	Antarctica	2010	17.6	LL5
Dominion Range 10020	DOM 10020	Antarctica	2010	27.7	L5
Dominion Range 10021	DOM 10021	Antarctica	2010	13.2	LL5
Dominion Range 10022	DOM 10022	Antarctica	2010	23.5	LL5
Dominion Range 10023	DOM 10023	Antarctica	2010	10.4	L6
Dominion Range 10024	DOM 10024	Antarctica	2010	11.7	H6
Dominion Range 10025	DOM 10025	Antarctica	2010	9.3	H5
Dominion Range 10026	DOM 10026	Antarctica	2010	23.1	L5
Dominion Range 10027	DOM 10027	Antarctica	2010	15	L5
Dominion Range 10028	DOM 10028	Antarctica	2010	18.1	L6
Dominion Range 10029	DOM 10029	Antarctica	2010	25.7	H5
Dominion Range 10040	DOM 10040	Antarctica	2010	17.4	H5
Dominion Range 10041	DOM 10041	Antarctica	2010	24	LL6
Dominion Range 10042	DOM 10042	Antarctica	2010	26.7	L6
Dominion Range 10043	DOM 10043	Antarctica	2010	33.1	LL6
Dominion Range 10044	DOM 10044	Antarctica	2010	17.8	LL5
Dominion Range 10045	DOM 10045	Antarctica	2010	12.7	L6
Dominion Range 10046	DOM 10046	Antarctica	2010	15.1	LL6
Dominion Range 10047	DOM 10047	Antarctica	2010	22.4	LL5
Dominion Range 10048	DOM 10048	Antarctica	2010	24.7	LL6
Dominion Range 10049	DOM 10049	Antarctica	2010	12	H5

Dominion Range 10123	DOM 10123	Antarctica	2010	31.4	LL5
Dominion Range 10124	DOM 10124	Antarctica	2010	22.5	L6
Dominion Range 10125	DOM 10125	Antarctica	2010	26.1	LL5
Dominion Range 10126	DOM 10126	Antarctica	2010	22.3	LL5
Dominion Range 10127	DOM 10127	Antarctica	2010	19.3	LL5
Dominion Range 10128	DOM 10128	Antarctica	2010	26	LL5
Dominion Range 10129	DOM 10129	Antarctica	2010	30.2	LL5
Dominion Range 10170	DOM 10170	Antarctica	2010	49.5	LL5
Dominion Range 10171	DOM 10171	Antarctica	2010	66.8	LL5
Dominion Range 10172	DOM 10172	Antarctica	2010	33.2	LL6
Dominion Range 10173	DOM 10173	Antarctica	2010	32.7	LL5
Dominion Range 10174	DOM 10174	Antarctica	2010	35.9	L6
Dominion Range 10175	DOM 10175	Antarctica	2010	24.6	LL5
Dominion Range 10176	DOM 10176	Antarctica	2010	18.8	L5
Dominion Range 10177	DOM 10177	Antarctica	2010	17	H6
Dominion Range 10178	DOM 10178	Antarctica	2010	19	L6
Dominion Range 10179	DOM 10179	Antarctica	2010	25.6	LL6
Dominion Range 10210	DOM 10210	Antarctica	2010	36	LL5
Dominion Range 10211	DOM 10211	Antarctica	2010	24.2	L6
Dominion Range 10212	DOM 10212	Antarctica	2010	25.4	LL5
Dominion Range 10213	DOM 10213	Antarctica	2010	22.9	H6
Dominion Range 10214	DOM 10214	Antarctica	2010	21.4	LL5
Dominion Range 10215	DOM 10215	Antarctica	2010	18.9	L5
Dominion Range 10216	DOM 10216	Antarctica	2010	33.7	LL5
Dominion Range 10217	DOM 10217	Antarctica	2010	18.6	L5
Dominion Range 10218	DOM 10218	Antarctica	2010	33.2	LL5
Dominion Range 10219	DOM 10219	Antarctica	2010	11.2	LL5
Dominion Range 10250	DOM 10250	Antarctica	2010	9.9	L6
Dominion Range 10251	DOM 10251	Antarctica	2010	9.4	L6
Dominion Range 10252	DOM 10252	Antarctica	2010	9.5	L6
Dominion Range 10253	DOM 10253	Antarctica	2010	9.5	H6
Dominion Range 10254	DOM 10254	Antarctica	2010	9.8	L6
Dominion Range 10255	DOM 10255	Antarctica	2010	14	LL5
Dominion Range 10256	DOM 10256	Antarctica	2010	13.9	LL5
Dominion Range 10258	DOM 10258	Antarctica	2010	6.6	L6
Dominion Range 10259	DOM 10259	Antarctica	2010	9.7	H5
Dominion Range 10270	DOM 10270	Antarctica	2010	2.1	L6
Dominion Range 10271	DOM 10271	Antarctica	2010	2.5	L6
Dominion Range 10272	DOM 10272	Antarctica	2010	5.6	LL5
Dominion Range 10273	DOM 10273	Antarctica	2010	2.7	L6
Dominion Range 10274	DOM 10274	Antarctica	2010	7.9	LL5
Dominion Range 10275	DOM 10275	Antarctica	2010	9.2	LL5
Dominion Range 10276	DOM 10276	Antarctica	2010	9.4	LL5
Dominion Range 10277	DOM 10277	Antarctica	2010	12.4	LL5

Dominion Range 10278	DOM 10278	Antarctica	2010	9.5	H6
Dominion Range 10279	DOM 10279	Antarctica	2010	4.7	LL5
Dominion Range 10280	DOM 10280	Antarctica	2010	23.9	LL5
Dominion Range 10281	DOM 10281	Antarctica	2010	33.6	LL5
Dominion Range 10282	DOM 10282	Antarctica	2010	33.7	LL6
Dominion Range 10284	DOM 10284	Antarctica	2010	23.2	LL5
Dominion Range 10285	DOM 10285	Antarctica	2010	26	L5
Dominion Range 10286	DOM 10286	Antarctica	2010	26.3	L5
Dominion Range 10287	DOM 10287	Antarctica	2010	16.1	L5
Dominion Range 10288	DOM 10288	Antarctica	2010	47.5	LL5
Dominion Range 10289	DOM 10289	Antarctica	2010	33.6	LL5
Dominion Range 10310	DOM 10310	Antarctica	2010	78.5	LL5
Dominion Range 10311	DOM 10311	Antarctica	2010	58.6	LL5
Dominion Range 10312	DOM 10312	Antarctica	2010	40.4	LL6
Dominion Range 10313	DOM 10313	Antarctica	2010	44.4	LL5
Dominion Range 10314	DOM 10314	Antarctica	2010	52.6	LL5
Dominion Range 10315	DOM 10315	Antarctica	2010	54.9	LL5
Dominion Range 10316	DOM 10316	Antarctica	2010	60.5	LL6
Dominion Range 10317	DOM 10317	Antarctica	2010	36	H6
Dominion Range 10318	DOM 10318	Antarctica	2010	57	LL6
Dominion Range 10319	DOM 10319	Antarctica	2010	36.6	LL6
Dominion Range 10320	DOM 10320	Antarctica	2010	26.5	LL5
Dominion Range 10321	DOM 10321	Antarctica	2010	25.2	H6
Dominion Range 10322	DOM 10322	Antarctica	2010	11.3	LL4-5
Dominion Range 10323	DOM 10323	Antarctica	2010	8.3	LL6
Dominion Range 10324	DOM 10324	Antarctica	2010	16.7	H6
Dominion Range 10325	DOM 10325	Antarctica	2010	39.1	LL6
Dominion Range 10326	DOM 10326	Antarctica	2010	24	LL6
Dominion Range 10327	DOM 10327	Antarctica	2010	21.3	L5
Dominion Range 10328	DOM 10328	Antarctica	2010	23	LL6
Dominion Range 10329	DOM 10329	Antarctica	2010	12.2	LL6
Dominion Range 10352	DOM 10352	Antarctica	2010	24.8	H5
Dominion Range 10353	DOM 10353	Antarctica	2010	12.2	H6
Dominion Range 10354	DOM 10354	Antarctica	2010	17.3	LL6
Dominion Range 10355	DOM 10355	Antarctica	2010	30.5	LL6
Dominion Range 10356	DOM 10356	Antarctica	2010	21.7	LL6
Dominion Range 10357	DOM 10357	Antarctica	2010	32.4	LL6
Dominion Range 10358	DOM 10358	Antarctica	2010	30.7	LL6
Dominion Range 10359	DOM 10359	Antarctica	2010	22.7	LL6
Dominion Range 10360	DOM 10360	Antarctica	2010	4.4	L6
Dominion Range 10361	DOM 10361	Antarctica	2010	9.2	H5
Dominion Range 10362	DOM 10362	Antarctica	2010	10.7	H5
Dominion Range 10364	DOM 10364	Antarctica	2010	25.4	L5
Dominion Range 10365	DOM 10365	Antarctica	2010	3.5	H6

Dominion Range 10366	DOM 10366	Antarctica	2010	9.1	H6
Dominion Range 10367	DOM 10367	Antarctica	2010	6.1	H6
Dominion Range 10368	DOM 10368	Antarctica	2010	2.4	L6
Dominion Range 10369	DOM 10369	Antarctica	2010	10.8	H6
Dominion Range 10400	DOM 10400	Antarctica	2010	35.5	LL5
Dominion Range 10401	DOM 10401	Antarctica	2010	40.8	LL5
Dominion Range 10402	DOM 10402	Antarctica	2010	37	LL5
Dominion Range 10403	DOM 10403	Antarctica	2010	38	LL5
Dominion Range 10404	DOM 10404	Antarctica	2010	38.8	H5
Dominion Range 10405	DOM 10405	Antarctica	2010	23.8	H5-6
Dominion Range 10406	DOM 10406	Antarctica	2010	10.6	LL5
Dominion Range 10407	DOM 10407	Antarctica	2010	12	H6
Dominion Range 10408	DOM 10408	Antarctica	2010	14.3	LL5
Dominion Range 10409	DOM 10409	Antarctica	2010	13.3	H6
Dominion Range 10410	DOM 10410	Antarctica	2010	5.6	CR2
Dominion Range 10411	DOM 10411	Antarctica	2010	9.6	H5
Dominion Range 10412	DOM 10412	Antarctica	2010	7.8	LL5
Dominion Range 10413	DOM 10413	Antarctica	2010	11.6	LL6
Dominion Range 10414	DOM 10414	Antarctica	2010	9.7	LL5
Dominion Range 10415	DOM 10415	Antarctica	2010	12.5	H5
Dominion Range 10416	DOM 10416	Antarctica	2010	9	LL5
Dominion Range 10417	DOM 10417	Antarctica	2010	2.9	H5
Dominion Range 10418	DOM 10418	Antarctica	2010	10.6	H6
Dominion Range 10419	DOM 10419	Antarctica	2010	15.1	LL6
Dominion Range 10430	DOM 10430	Antarctica	2010	5.6	LL6
Dominion Range 10431	DOM 10431	Antarctica	2010	10.9	L6
Dominion Range 10432	DOM 10432	Antarctica	2010	8.8	LL6
Dominion Range 10434	DOM 10434	Antarctica	2010	8	H6
Dominion Range 10435	DOM 10435	Antarctica	2010	9.3	H4
Dominion Range 10436	DOM 10436	Antarctica	2010	14	LL5
Dominion Range 10437	DOM 10437	Antarctica	2010	15.9	LL5
Dominion Range 10438	DOM 10438	Antarctica	2010	23.4	LL5
Dominion Range 10440	DOM 10440	Antarctica	2010	22.6	L-imp melt
Dominion Range 10441	DOM 10441	Antarctica	2010	17.8	H5
Dominion Range 10442	DOM 10442	Antarctica	2010	38.1	LL5
Dominion Range 10443	DOM 10443	Antarctica	2010	46.1	LL5
Dominion Range 10444	DOM 10444	Antarctica	2010	42.3	LL6
Dominion Range 10445	DOM 10445	Antarctica	2010	42	L5
Dominion Range 10446	DOM 10446	Antarctica	2010	35.4	LL5
Dominion Range 10447	DOM 10447	Antarctica	2010	78.5	LL5
Dominion Range 10448	DOM 10448	Antarctica	2010	55.7	LL6
Dominion Range 10449	DOM 10449	Antarctica	2010	89.6	LL5
Dominion Range 10455	DOM 10455	Antarctica	2010	45.9	L5
Dominion Range 10456	DOM 10456	Antarctica	2010	59.8	L5

Dominion Range 10457	DOM 10457	Antarctica	2010	62.3	LL5
Dominion Range 10458	DOM 10458	Antarctica	2010	84.6	L5
Dominion Range 10459	DOM 10459	Antarctica	2010	42.4	H5
Dominion Range 10480	DOM 10480	Antarctica	2010	12.9	L6
Dominion Range 10481	DOM 10481	Antarctica	2010	10.2	L6
Dominion Range 10482	DOM 10482	Antarctica	2010	12.8	L6
Dominion Range 10483	DOM 10483	Antarctica	2010	6.8	H6
Dominion Range 10484	DOM 10484	Antarctica	2010	5.9	L5
Dominion Range 10485	DOM 10485	Antarctica	2010	27.5	LL6
Dominion Range 10486	DOM 10486	Antarctica	2010	24.3	L5
Dominion Range 10487	DOM 10487	Antarctica	2010	22.9	L6
Dominion Range 10488	DOM 10488	Antarctica	2010	24.1	L6
Dominion Range 10489	DOM 10489	Antarctica	2010	12.7	LL6
Dominion Range 10495	DOM 10495	Antarctica	2010	51.6	L6
Dominion Range 10496	DOM 10496	Antarctica	2010	55.7	LL6
Dominion Range 10497	DOM 10497	Antarctica	2010	34.3	LL6
Dominion Range 10498	DOM 10498	Antarctica	2010	27	LL6
Dominion Range 10499	DOM 10499	Antarctica	2010	34.3	LL6
Dominion Range 10500	DOM 10500	Antarctica	2010	78.4	LL6
Dominion Range 10501	DOM 10501	Antarctica	2010	52.1	LL6
Dominion Range 10502	DOM 10502	Antarctica	2010	53	LL6
Dominion Range 10503	DOM 10503	Antarctica	2010	73.7	LL6
Dominion Range 10504	DOM 10504	Antarctica	2010	53.8	LL6
Dominion Range 10505	DOM 10505	Antarctica	2010	56.8	LL6
Dominion Range 10506	DOM 10506	Antarctica	2010	52.1	H5
Dominion Range 10507	DOM 10507	Antarctica	2010	35.8	LL5
Dominion Range 10508	DOM 10508	Antarctica	2010	46.5	LL6
Dominion Range 10509	DOM 10509	Antarctica	2010	38.4	L5
Dominion Range 10510	DOM 10510	Antarctica	2010	30	L6
Dominion Range 10511	DOM 10511	Antarctica	2010	14.5	L5
Dominion Range 10512	DOM 10512	Antarctica	2010	32.9	LL6
Dominion Range 10513	DOM 10513	Antarctica	2010	30.2	LL6
Dominion Range 10514	DOM 10514	Antarctica	2010	22.5	LL6
Dominion Range 10515	DOM 10515	Antarctica	2010	23.9	LL6
Dominion Range 10516	DOM 10516	Antarctica	2010	13.3	L6
Dominion Range 10517	DOM 10517	Antarctica	2010	19.6	LL6
Dominion Range 10518	DOM 10518	Antarctica	2010	9	H5
Dominion Range 10519	DOM 10519	Antarctica	2010	9.9	H6
Dominion Range 10530	DOM 10530	Antarctica	2010	17.9	H6
Dominion Range 10531	DOM 10531	Antarctica	2010	15.2	H6
Dominion Range 10532	DOM 10532	Antarctica	2010	8.5	H6
Dominion Range 10533	DOM 10533	Antarctica	2010	15.4	LL5
Dominion Range 10534	DOM 10534	Antarctica	2010	13	L6
Dominion Range 10535	DOM 10535	Antarctica	2010	9.2	LL5

Dominion Range 10536	DOM 10536	Antarctica	2010	17.1	LL5
Dominion Range 10537	DOM 10537	Antarctica	2010	13.2	LL6
Dominion Range 10538	DOM 10538	Antarctica	2010	13.9	LL6
Dominion Range 10539	DOM 10539	Antarctica	2010	29	LL6
Dominion Range 10540	DOM 10540	Antarctica	2010	22.3	H6
Dominion Range 10541	DOM 10541	Antarctica	2010	30.4	LL5
Dominion Range 10542	DOM 10542	Antarctica	2010	38.8	L5
Dominion Range 10543	DOM 10543	Antarctica	2010	33.4	LL5
Dominion Range 10544	DOM 10544	Antarctica	2010	41.6	H6
Dominion Range 10545	DOM 10545	Antarctica	2010	38.2	LL6
Dominion Range 10546	DOM 10546	Antarctica	2010	41.1	LL5
Dominion Range 10547	DOM 10547	Antarctica	2010	25.2	LL6
Dominion Range 10548	DOM 10548	Antarctica	2010	24.9	L6
Dominion Range 10549	DOM 10549	Antarctica	2010	37.7	L5
Dominion Range 10566	DOM 10566	Antarctica	2010	38.5	L5
Dominion Range 10590	DOM 10590	Antarctica	2010	20.5	L6
Dominion Range 10591	DOM 10591	Antarctica	2010	39.2	H6
Dominion Range 10592	DOM 10592	Antarctica	2010	39.2	LL6
Dominion Range 10593	DOM 10593	Antarctica	2010	47.5	L6
Dominion Range 10594	DOM 10594	Antarctica	2010	39.3	L6
Dominion Range 10595	DOM 10595	Antarctica	2010	35	L5
Dominion Range 10596	DOM 10596	Antarctica	2010	34.3	L6
Dominion Range 10597	DOM 10597	Antarctica	2010	47.5	L3
Dominion Range 10598	DOM 10598	Antarctica	2010	28.1	L6
Dominion Range 10599	DOM 10599	Antarctica	2010	27.2	L6
Dominion Range 10600	DOM 10600	Antarctica	2010	31.4	H6
Dominion Range 10601	DOM 10601	Antarctica	2010	26.2	H6
Dominion Range 10602	DOM 10602	Antarctica	2010	16.4	LL6
Dominion Range 10603	DOM 10603	Antarctica	2010	13	LL6
Dominion Range 10604	DOM 10604	Antarctica	2010	30.1	LL6
Dominion Range 10605	DOM 10605	Antarctica	2010	23.8	H6
Dominion Range 10606	DOM 10606	Antarctica	2010	25	LL6
Dominion Range 10607	DOM 10607	Antarctica	2010	27.1	LL5
Dominion Range 10608	DOM 10608	Antarctica	2010	31.4	LL6
Dominion Range 10609	DOM 10609	Antarctica	2010	31.8	H5
Dominion Range 10630	DOM 10630	Antarctica	2010	17.3	LL6
Dominion Range 10631	DOM 10631	Antarctica	2010	12.7	H5
Dominion Range 10632	DOM 10632	Antarctica	2010	14.6	LL5
Dominion Range 10633	DOM 10633	Antarctica	2010	28.8	LL6
Dominion Range 10634	DOM 10634	Antarctica	2010	20	H6
Dominion Range 10635	DOM 10635	Antarctica	2010	15.2	LL6
Dominion Range 10636	DOM 10636	Antarctica	2010	17.8	LL6
Dominion Range 10637	DOM 10637	Antarctica	2010	27	LL6
Dominion Range 10638	DOM 10638	Antarctica	2010	15.3	LL6

Dominion Range 10639	DOM 10639	Antarctica	2010	14.6	L5
Dominion Range 10810	DOM 10810	Antarctica	2010	50.7	LL6
Dominion Range 10811	DOM 10811	Antarctica	2010	48.8	L6
Dominion Range 10812	DOM 10812	Antarctica	2010	33.9	L5
Dominion Range 10813	DOM 10813	Antarctica	2010	36.1	LL6
Dominion Range 10814	DOM 10814	Antarctica	2010	23.5	LL6
Dominion Range 10815	DOM 10815	Antarctica	2010	27.8	LL6
Dominion Range 10816	DOM 10816	Antarctica	2010	22.5	L6
Dominion Range 10817	DOM 10817	Antarctica	2010	18.1	LL6
Dominion Range 10818	DOM 10818	Antarctica	2010	31.6	L5
Dominion Range 10819	DOM 10819	Antarctica	2010	25.9	LL6
Dongyang		China	July 2002	230	H5
Draveil		France	13 July 2011	7500	H5
El Médano 077		Chile	2011 Oct 30	72	L4
El Médano 080		Chile	2011 Oct 21	24.5	L6
El Médano 081		Chile	2011 Oct 22	13.4	H4
El Médano 082		Chile	2011 Oct 22	22.5	H5
El Médano 083		Chile	2011 Oct 22	12.6	H5
El Médano 084		Chile	2011 Oct 23	45	H5
El Médano 085		Chile	2011 Oct 23	12.9	H4
El Médano 086		Chile	2011 Oct 23	1258	H4
El Médano 087		Chile	2011 Oct 23	13.9	H4
El Médano 088		Chile	2011 Oct 23	10.1	L6
El Médano 089		Chile	2011 Oct 23	296	L6
El Médano 090		Chile	2011 Oct 24	18.8	L6
El Médano 091		Chile	2011 Oct 25	17.8	H5
El Médano 092		Chile	2011 Oct 25	289	H6
El Médano 093		Chile	2011 Oct 25	51.8	H4-6
El Médano 094		Chile	2011 Oct 25	35.3	L6
El Médano 095		Chile	2011 Oct 30	72	LL6
El Médano 096		Chile	2011 Oct 26	11.1	Acapulcoite
El Médano 097		Chile	2011 Oct 25	229	L5-6
El Médano 098		Chile	2011 Oct 25	135	L6
El Médano 099		Chile	2011 Oct 25	10.5	H5
El Médano 100		Chile	2011 Oct 24	1.8	C2-ung
El Médano 101		Chile	2011 Oct 21	19.1	L6
El Médano 102		Chile	2011 Oct 30	65	H4/5
El Médano 103		Chile	2011 Oct 21	61	LL6
El Médano 104		Chile	2011 Oct 22	27	LL5
El Médano 105		Chile	2011 Oct 22	16.7	H5/6
El Médano 106		Chile	2011 Oct 24	91	H5/6
El Médano 107		Chile	2011 Oct 25	10.3	H5/6
El Médano 108		Chile	2011 Oct 30	15.5	H4
El Médano 109		Chile	2011 Oct 30	13.1	H3

El Médano 110	Chile	2011 Oct 31	28.8	LL6
El Médano 111	Chile	2011 Oct 22	139	H5
El Médano 112	Chile	2011 Oct 23	23	H5
El Médano 113	Chile	2011 Oct 23	37	L6
El Médano 114	Chile	2011 Oct 24	24.4	H5
El Médano 115	Chile	2011 Oct 30	84	H5
El Médano 116	Chile	2011 Oct 24	46	H6
El Médano 117	Chile	2011 Oct 24	52	L6
El Médano 118	Chile	2011 Oct 24	161	H5
El Médano 119	Chile	2010 Oct 25	23.3	H5
El Médano 120	Chile	2011 Oct 25	24.2	H5
El Médano 121	Chile	2011 Oct 25	333	H5
El Médano 122	Chile	2011 Oct 28	55	L5/6
El Médano 123	Chile	2011 Oct 30	22.1	H5
El Médano 124	Chile	2011 Oct 31	39	H5
El Médano 125	Chile	2011 Oct 25	93	L6
El Médano 126	Chile	2011 Oct 26	584	H5
El Médano 127	Chile	2011 Oct 26	130	H5
El Médano 128	Chile	2011 Oct 30	556	L6
El Médano 129	Chile	2011 Oct 30	27.8	L6
El Médano 130	Chile	2011 Oct 30	43.6	L6
El Médano 131	Chile	2011 Oct 21	106	H4
El Médano 132	Chile	2011 Oct 21	670	H4
El Médano 133	Chile	2011 Oct 22	397	LL6
El Médano 134	Chile	2011 Oct 22	20.5	H5
El Médano 135	Chile	2011 Oct 22	71	L6
El Médano 136	Chile	2011 Oct 22	57	L5
El Médano 137	Chile	2011 Oct 22	37	H5
El Médano 138	Chile	2011 Oct 22	17.9	L6
El Médano 139	Chile	2011 Oct 22	11.3	H5
El Médano 140	Chile	2011 Oct 24	11.5	H4/5
El Médano 141	Chile	2011 Oct 24	752	L6
El Médano 142	Chile	2011 Oct 24	20.5	L6
El Médano 143	Chile	2011 Oct 24	59	H4
El Médano 144	Chile	2011 Oct 24	87	L4
El Médano 145	Chile	2011 Oct 24	20.4	H5
El Médano 146	Chile	2011 Oct 24	10.9	H4
El Médano 147	Chile	2011 Oct 24	19.9	L6
El Médano 148	Chile	2011 Oct 24	298	H5
El Médano 149	Chile	2011 Oct 25	99	H5
El Médano 150	Chile	2011 Oct 26	56	L6
El Médano 151	Chile	2011 Oct 26	12.6	H4
El Médano 152	Chile	2011 Oct 30	45	H4
El Médano 153	Chile	2010 Oct 23	6038	H3

El Médano 154	Chile	2011 Jun 30	1047	L6
El Médano 155	Chile	2011 Jun 30	517	H6
El Médano 156	Chile	2011 Jul 1	161	L6
El Médano 157	Chile	2011 Jul 1	620	H4
El Médano 158	Chile	2011 Oct 23	38	H4
El Médano 159	Chile	2011 Oct 23	12.3	L6
El Médano 160	Chile	2011 Oct 23	88	H6
El Médano 161	Chile	2011 Oct 25	91	H5
El Médano 162	Chile	2011 Oct 28	147	L4
El Médano 163	Chile	2011 Oct 30	20.4	L6
El Médano 164	Chile	2011 Oct 25	282	H5
El Médano 165	Chile	2011 Oct 25	53	L6
El Médano 166	Chile	2011 Oct 25	42	L5
El Médano 167	Chile	2011 Oct 30	163	H4
El Médano 168	Chile	2011 Oct 25	6.7	L6
El Médano 169	Chile	2011 Oct 25	228	L6
El Médano 170	Chile	2011 Apr 5	3893	L4
El Médano 171	Chile	2011 Jun 22	1821	H5
El Médano 172	Chile	2011 Jun 24	1097	H5
El Médano 173	Chile	2011 Jun 24	448	L6
El Médano 174	Chile	2011 Jun 30	434	L6
El Médano 175	Chile	2011 Jun 30	147	L6
El Médano 176	Chile	2011 Jul 1	64	L6
El Médano 177	Chile	2011 Jul 1	1198	H5
El Médano 178	Chile	2011 Jun 30	5758	H5
El Médano 179	Chile	2011 Oct 21	14.9	H3
El Médano 180	Chile	2011 Oct 22	166	H3-5
El Médano 181	Chile	2011 Oct 24	33.5	L3
El Médano 182	Chile	2011 Oct 25	89	H3
El Médano 183	Chile	2011 Oct 25	6.9	H5
El Médano 184	Chile	2011 Oct 30	474	H5
El Médano 185	Chile	2011 Oct 22	172	H5
El Médano 186	Chile	2011 Oct 24	219	H5
El Médano 187	Chile	2011 Oct 24	61	H5
El Médano 188	Chile	2011 Oct 25	40	H6
El Médano 189	Chile	2011 Oct 25	46	H6
El Médano 190	Chile	2011 Oct 24	2220	H5
El Médano 191	Chile	2011 Oct 25	138	H5
El Médano 192	Chile	2011 Oct 29	15.7	H5/6
El Médano 193	Chile	2010 Oct 27	347	L6
El Médano 194	Chile	2011 Jun 30	9521	H5
El Médano 195	Chile	2011 Oct 23	25.2	H/L3
El Médano 196	Chile	2011 Oct 26	18.8	LL3
El Médano 197	Chile	2011 Oct 22	128	L6

El Médano 198		Chile	2011 Oct 22	799	H6
El Médano 199		Chile	2011 Oct 25	148	H6
El Médano 200		Chile	2011 Oct 29	2.4	C3
El Médano 201		Chile	2010 Oct 23	3356	H5
El Médano 202		Chile	2011 Oct 25	5.5	L6
El Médano 203		Chile	2011 Oct 21	2.3	LL6
El Médano 204		Chile	2011 Oct 21	9.2	H5
El Médano 205		Chile	2011 Oct 31	3.1	H5
El Médano 206		Chile	2011 Oct 21	2.7	H6
El Médano 207		Chile	2011 Oct 30	4.7	H5
El Médano 208		Chile	2011 Oct 25	65	H6
El Médano 209		Chile	2011 Oct 24	9.7	CO3
El Médano 210		Chile	2011 Oct 24	2.7	H6
El Médano 211		Chile	2010 Oct 27	224	H5
El Médano 212		Chile	2011 Jun 30	175	H5
El Médano 213		Chile	2011 Jul 1	98	L6
El Médano 214		Chile	2011 Jul 1	81	L6
El-Shaikh Fadl 001	ESF 001	Egypt	Apr 2010	476	H5
El-Shaikh Fadl 002	ESF 002	Egypt	Apr 2010	806	H5
El-Shaikh Fadl 003	ESF 003	Egypt	2009 Dec	73	H4
El-Shaikh Fadl 004	ESF 004	Egypt	2009 Dec	8012	L5
El-Shaikh Fadl 005	ESF 005	Egypt	Apr 2010	538	L-melt rock
Emerson Dry Lake		United States	2006 Apr 18	32	L6
Ferintosh		Canada			
Garfield Flat		United States	2007 Sep 1	14.7	H5
Grass Valley		United States	2011 Dec 26	19.85	H4
Graves Nunataks 12512	GRA 12512	Antarctica	2012	21.6	CO3
Gresia		Romania	1990	26900	H4
Grove Mountains 090001	GRV 090001	Antarctica	2009 Dec 30	221.50	L4
Grove Mountains 090002	GRV 090002	Antarctica	2010 Jan 4	30.80	H4
Grove Mountains 090004	GRV 090004	Antarctica	2010 Jan 8	698.93	L6
Grove Mountains 090005	GRV 090005	Antarctica	2010 Jan 8	365.85	L5
Grove Mountains 090007	GRV 090007	Antarctica	2010 Jan 8	141.85	L5
Grove Mountains 090008	GRV 090008	Antarctica	2010 Jan 8	266.37	L5
Grove Mountains 090078	GRV 090078	Antarctica	2010 Jan 8	156.38	L5
Grove Mountains 090105	GRV 090105	Antarctica	2010 Jan 8	622.90	L5
Grove Mountains 090128	GRV 090128	Antarctica	2010 Jan 8	235.73	L5
Grove Mountains 090142	GRV 090142	Antarctica	2010 Jan 8	354.65	L5
Grove Mountains 090143	GRV 090143	Antarctica	2010 Jan 8	106.16	L5
Grove Mountains 090154	GRV 090154	Antarctica	2010 Jan 8	234.76	L5
Grove Mountains 090166	GRV 090166	Antarctica	2010 Jan 8	562.00	L5
Grove Mountains 090168	GRV 090168	Antarctica	2010 Jan 8	259.20	L5
Grove Mountains 090251	GRV 090251	Antarctica	2010 Jan 8	88.08	L4
Grove Mountains 090253	GRV 090253	Antarctica	2010 Jan 8	92.99	L5

Grove Mountains 090297	GRV 090297	Antarctica	2010 Jan 10	14.73	L4
Grove Mountains 090298	GRV 090298	Antarctica	2010 Jan 10	12.30	L4
Grove Mountains 090306	GRV 090306	Antarctica	2010 Jan 14	67.19	L3
Grove Mountains 090312	GRV 090312	Antarctica	2010 Jan 14	13.30	Ureilite
Grove Mountains 090325	GRV 090325	Antarctica	2010 Jan 15	28.25	H4
Grove Mountains 090328	GRV 090328	Antarctica	2010 Jan 15	85.32	H4
Grove Mountains 090331	GRV 090331	Antarctica	2010 Jan 15	485.70	H5
Grove Mountains 090332	GRV 090332	Antarctica	2010 Jan 15	83.13	H4
Grove Mountains 090334	GRV 090334	Antarctica	2010 Jan 15	11.58	H4
Grove Mountains 090469	GRV 090469	Antarctica	2010 Jan 23	85.90	L5
Grove Mountains 090470	GRV 090470	Antarctica	2010 Jan 23	129.33	L5
Grove Mountains 090479	GRV 090479	Antarctica	2010 Jan 23	66.27	L4
Grove Mountains 090591	GRV 090591	Antarctica	2010 Jan 23	227.61	LL5
Grove Mountains 090647	GRV 090647	Antarctica	2010 Jan 23	312.39	L5
Grove Mountains 090719	GRV 090719	Antarctica	2010 Jan 29	165.73	L6
Grove Mountains 090746	GRV 090746	Antarctica	2010 Jan 28	28.25	H5
Grove Mountains 090748	GRV 090748	Antarctica	2010 Jan 28	16.19	LL4
Grove Mountains 090749	GRV 090749	Antarctica	2010 Jan 28	13.87	L5
Grove Mountains 090750	GRV 090750	Antarctica	2010 Jan 28	24.65	L5
Grove Mountains 090751	GRV 090751	Antarctica	2010 Jan 28	14.87	L5
Grove Mountains 090752	GRV 090752	Antarctica	2010 Jan 28	25.15	H4
Grove Mountains 090753	GRV 090753	Antarctica	2010 Jan 28	14.65	L5
Grove Mountains 090755	GRV 090755	Antarctica	2010 Jan 29	453.70	L5
Grove Mountains 090756	GRV 090756	Antarctica	2010 Jan 29	192.70	L5
Grove Mountains 090757	GRV 090757	Antarctica	2010 Jan 29	171.20	L5
Grove Mountains 090758	GRV 090758	Antarctica	2010 Jan 29	65.44	L5
Grove Mountains 090825	GRV 090825	Antarctica	2010 Jan 29	21.62	L5
Grove Mountains 090831	GRV 090831	Antarctica	2010 Jan 29	193.24	L5
Grove Mountains 090832	GRV 090832	Antarctica	2010 Jan 29	47.96	L4
Grove Mountains 090833	GRV 090833	Antarctica	2010 Jan 29	52.18	L5
Grove Mountains 090837	GRV 090837	Antarctica	2010 Jan 29	58.02	L5
Grove Mountains 090863	GRV 090863	Antarctica	2010 Jan 29	210.41	L4
Grove Mountains 090867	GRV 090867	Antarctica	2010 Jan 29	83.52	L5
Grove Mountains 090916	GRV 090916	Antarctica	2010 Jan 29	37.04	L5
Grove Mountains 090975	GRV 090975	Antarctica	2010 Jan 29	57.51	L5
Grove Mountains 090994	GRV 090994	Antarctica	2010 Feb 1	369.10	Mesosiderite
Grove Mountains 091001	GRV 091001	Antarctica	2010 Feb 1	278.74	L3
Grove Mountains 091002	GRV 091002	Antarctica	2010 Feb 1	269.19	H4
Grove Mountains 091013	GRV 091013	Antarctica	2010 Feb 1	253.75	L4
Grove Mountains 091014	GRV 091014	Antarctica	2010 Feb 1	40.70	H4
Grove Mountains 091015	GRV 091015	Antarctica	2010 Feb 1	125.41	L5
Grove Mountains 091017	GRV 091017	Antarctica	2010 Feb 1	120.47	H4
Heyetang		China	late Oct 1998	2500	L3
Hongshagang		China	2013 Sept 6	128	H3

Indian Butte		United States	7 June 1998	1721	H5
Jbilet Winselwan		Western Sahara	24 May 2013	~6000	CM2
Jiddat al Harasis 567	JaH 567	Oman	2009 Mar 6	374	H3.6
Jiddat al Harasis 718	JaH 718	Oman	15 Oct 2001	10	Eucrite
Jiddat al Harasis 798	JaH 798	Oman	2001 Apr 15	16.6	Mesosiderite
Jiddat al Harasis 799	JaH 799	Oman	Dec 2012	212	LL6
Jiddat al Harasis 800	JaH 800	Oman	2011 Jan 22	1299	Ureilite
Jiddat al Harasis 801	JaH 801	Oman	2011 Jan 25	376.2	H3-6
Jiddat al Harasis 802	JaH 802	Oman	2011 Jan 26	1191	L3-6
Jiddat al Harasis 803	JaH 803	Oman	Jan 2011	106.8	H5
Jiddat al Harasis 804	JaH 804	Oman	2013 Jan	4400	Eucrite
Jiddat al Harasis 806	JaH 806	Oman	Jan 2013	330	L5
Jiddat al Harasis 807	JaH 807	Oman	Jan 2013	1620	H4
Jiddat al Harasis 808	JaH 808	Oman	Jan 2013	2640	LL6
Jiddat al Harasis 809	JaH 809	Oman	Jan 2013	1825	Ureilite
Jiddat al Harasis 810	JaH 810	Oman	Jan 2013	370	L5
Jiddat al Harasis 811	JaH 811	Oman	Jan 2013	275	L6
Jiddat al Harasis 812	JaH 812	Oman	Jan 2013	480	L6
Jiddat al Harasis 813	JaH 813	Oman	Jan 2013	8800	L6
Jiddat al Harasis 814	JaH 814	Oman	Jan 2013	1200	L6
Jiddat al Harasis 815	JaH 815	Oman	2013	145	CO3
Jiddat al Harasis 816	JaH 816	Oman	2013	6900	L6
Jiddat al Harasis 817	JaH 817	Oman	2013	6100	L6
Jungo 004		United States	15 Aug 10	114.2	H6
Jungo 005		United States	8 Oct 10	103.6	L6
Jungo 006		United States	8 Oct 10	63.6	H5
Katol		India	22 May 2012	13000	L6
Keystone Lake		United States	22 Dec 2003	787	L5
Kharabali		Russia	before 2001	140000	H5
Ksar Daghara 001	KD 001	Tunisia	2012 Apr	18.36	H6
Ksar Daghara 002	KD 002	Tunisia	2012 Apr	30.08	H6
Ksar Ghilane 012	KG 012	Tunisia	April 2012	19.22	H6
Ksar Ghilane 013	KG 013	Tunisia	April 2012	37.4	H5
Ksar Ghilane 014	KG 014	Tunisia	April 2012	19.78	H4
Ksar Ghilane 015	KG 015	Tunisia	April 2012	10.06	H4
Kumtag 004		China	17 May 2012	2	L5
Kumtag 005		China	2011	709	L5
Kumtag 006		China	2011	191	L4
Kumtag 007		China	2011	116	H4
Kumtag 008		China	2011	237	L5
Kumtag 009		China	2011	922	L4
Kumtag 010		China	2011	1362	L4
Kumtag 011		China	2011	194	L4
Kumtag 012		China	2011	417	L4

Ladkee		Pakistan	4 May 2012	69	H6
LaPaz Icefield 10001	LAP 10001	Antarctica	2010	6473.6	H4
LaPaz Icefield 10002	LAP 10002	Antarctica	2010	9530	LL5
LaPaz Icefield 10003	LAP 10003	Antarctica	2010	1831.7	LL5
LaPaz Icefield 10004	LAP 10004	Antarctica	2010	2249.6	LL5
LaPaz Icefield 10005	LAP 10005	Antarctica	2010	2314.6	LL5
LaPaz Icefield 10006	LAP 10006	Antarctica	2010	3250.7	LL5
LaPaz Icefield 10007	LAP 10007	Antarctica	2010	1692.2	LL5
LaPaz Icefield 10008	LAP 10008	Antarctica	2010	2276.7	LL5
LaPaz Icefield 10009	LAP 10009	Antarctica	2010	1327.9	LL6
LaPaz Icefield 10010	LAP 10010	Antarctica	2010	1138.4	LL5
LaPaz Icefield 10011	LAP 10011	Antarctica	2010	797.2	L6
LaPaz Icefield 10012	LAP 10012	Antarctica	2010	5115.8	LL5
LaPaz Icefield 10013	LAP 10013	Antarctica	2010	1274.4	LL5
LaPaz Icefield 10015	LAP 10015	Antarctica	2010	511.5	LL5
LaPaz Icefield 10016	LAP 10016	Antarctica	2010	530.5	LL5
LaPaz Icefield 10017	LAP 10017	Antarctica	2010	236.8	L5
LaPaz Icefield 10018	LAP 10018	Antarctica	2010	254.8	Howardite
LaPaz Icefield 10019	LAP 10019	Antarctica	2010	358.8	LL5
LaPaz Icefield 10020	LAP 10020	Antarctica	2010	344.9	LL5
LaPaz Icefield 10021	LAP 10021	Antarctica	2010	379.4	LL5
LaPaz Icefield 10022	LAP 10022	Antarctica	2010	382.4	LL5
LaPaz Icefield 10023	LAP 10023	Antarctica	2010	378.5	LL5
LaPaz Icefield 10024	LAP 10024	Antarctica	2010	177.2	LL5
LaPaz Icefield 10025	LAP 10025	Antarctica	2010	73.3	L6
LaPaz Icefield 10026	LAP 10026	Antarctica	2010	122	L5
LaPaz Icefield 10027	LAP 10027	Antarctica	2010	62.9	LL5
LaPaz Icefield 10028	LAP 10028	Antarctica	2010	77.3	L6
LaPaz Icefield 10029	LAP 10029	Antarctica	2010	122.2	LL6
LaPaz Icefield 10034	LAP 10034	Antarctica	2010	145.5	LL5
LaPaz Icefield 10035	LAP 10035	Antarctica	2010	87.6	LL5
LaPaz Icefield 10036	LAP 10036	Antarctica	2010	49.4	L5
LaPaz Icefield 10037	LAP 10037	Antarctica	2010	114.5	LL5
LaPaz Icefield 10038	LAP 10038	Antarctica	2010	40.5	H6
LaPaz Icefield 10039	LAP 10039	Antarctica	2010	57.6	LL6
LaPaz Icefield 10040	LAP 10040	Antarctica	2010	73.9	LL5
LaPaz Icefield 10041	LAP 10041	Antarctica	2010	37.8	LL5
LaPaz Icefield 10042	LAP 10042	Antarctica	2010	95.9	LL5
LaPaz Icefield 10043	LAP 10043	Antarctica	2010	79.5	L5
LaPaz Icefield 10044	LAP 10044	Antarctica	2010	46.3	LL5
LaPaz Icefield 10045	LAP 10045	Antarctica	2010	83.4	H5
LaPaz Icefield 10046	LAP 10046	Antarctica	2010	106.2	LL5
LaPaz Icefield 10047	LAP 10047	Antarctica	2010	62	L5
LaPaz Icefield 10048	LAP 10048	Antarctica	2010	43	L6

LaPaz Icefield 10049	LAP 10049	Antarctica	2010	81	LL5
LaPaz Icefield 10050	LAP 10050	Antarctica	2010	31.1	LL6
LaPaz Icefield 10051	LAP 10051	Antarctica	2010	19.3	L6
LaPaz Icefield 10052	LAP 10052	Antarctica	2010	22.3	LL5
LaPaz Icefield 10053	LAP 10053	Antarctica	2010	21.1	LL6
LaPaz Icefield 10054	LAP 10054	Antarctica	2010	19.1	LL5
LaPaz Icefield 10055	LAP 10055	Antarctica	2010	11.3	LL6
LaPaz Icefield 10056	LAP 10056	Antarctica	2010	15	L6
LaPaz Icefield 10057	LAP 10057	Antarctica	2010	46.8	H6
LaPaz Icefield 10058	LAP 10058	Antarctica	2010	44.2	LL5
LaPaz Icefield 10059	LAP 10059	Antarctica	2010	72.7	LL5
LaPaz Icefield 10060	LAP 10060	Antarctica	2010	31.0	Howardite
LaPaz Icefield 10061	LAP 10061	Antarctica	2010	81.2	LL5
LaPaz Icefield 10062	LAP 10062	Antarctica	2010	63.7	LL5
LaPaz Icefield 10063	LAP 10063	Antarctica	2010	97.6	LL5
LaPaz Icefield 10064	LAP 10064	Antarctica	2010	21.0	LL6
LaPaz Icefield 10065	LAP 10065	Antarctica	2010	30.1	LL5
LaPaz Icefield 10066	LAP 10066	Antarctica	2010	43.5	LL5
LaPaz Icefield 10067	LAP 10067	Antarctica	2010	29.2	LL6
LaPaz Icefield 10068	LAP 10068	Antarctica	2010	30.7	L5
LaPaz Icefield 10069	LAP 10069	Antarctica	2010	7.1	L5
LaPaz Icefield 10070	LAP 10070	Antarctica	2010	22.2	LL5
LaPaz Icefield 10071	LAP 10071	Antarctica	2010	28.1	LL5
LaPaz Icefield 10072	LAP 10072	Antarctica	2010	28	L5
LaPaz Icefield 10073	LAP 10073	Antarctica	2010	13.4	L5
LaPaz Icefield 10074	LAP 10074	Antarctica	2010	8.9	LL5
LaPaz Icefield 10075	LAP 10075	Antarctica	2010	6.3	L5
LaPaz Icefield 10076	LAP 10076	Antarctica	2010	17.3	LL5
LaPaz Icefield 10077	LAP 10077	Antarctica	2010	29.7	LL5
LaPaz Icefield 10078	LAP 10078	Antarctica	2010	38.6	LL6
LaPaz Icefield 10079	LAP 10079	Antarctica	2010	39.8	LL5
LaPaz Icefield 10080	LAP 10080	Antarctica	2010	2.6	L6
LaPaz Icefield 10081	LAP 10081	Antarctica	2010	2.5	L6
LaPaz Icefield 10082	LAP 10082	Antarctica	2010	0.8	H6
LaPaz Icefield 10083	LAP 10083	Antarctica	2010	2.1	L5
LaPaz Icefield 10084	LAP 10084	Antarctica	2010	1.2	L6
LaPaz Icefield 10085	LAP 10085	Antarctica	2010	1.4	L6
LaPaz Icefield 10086	LAP 10086	Antarctica	2010	6	L6
LaPaz Icefield 10087	LAP 10087	Antarctica	2010	4.2	LL6
LaPaz Icefield 10088	LAP 10088	Antarctica	2010	1.7	H5
LaPaz Icefield 10089	LAP 10089	Antarctica	2010	4.9	LL6
LaPaz Icefield 10090	LAP 10090	Antarctica	2010	12.1	LL5
LaPaz Icefield 10091	LAP 10091	Antarctica	2010	8.2	L5
LaPaz Icefield 10092	LAP 10092	Antarctica	2010	18.1	H6

LaPaz Icefield 10093	LAP 10093	Antarctica	2010	13.5	H6
LaPaz Icefield 10094	LAP 10094	Antarctica	2010	10.1	H5
LaPaz Icefield 10095	LAP 10095	Antarctica	2010	13.9	H5
LaPaz Icefield 10096	LAP 10096	Antarctica	2010	28.1	LL5
LaPaz Icefield 10097	LAP 10097	Antarctica	2010	24.3	LL5
LaPaz Icefield 10098	LAP 10098	Antarctica	2010	46.5	LL5
LaPaz Icefield 10099	LAP 10099	Antarctica	2010	41.4	LL5
LaPaz Icefield 10100	LAP 10100	Antarctica	2010	11.5	LL6
LaPaz Icefield 10101	LAP 10101	Antarctica	2010	15.4	Howardite
LaPaz Icefield 10102	LAP 10102	Antarctica	2010	17.5	LL6
LaPaz Icefield 10103	LAP 10103	Antarctica	2010	23.7	LL5
LaPaz Icefield 10104	LAP 10104	Antarctica	2010	22.0	L6
LaPaz Icefield 10105	LAP 10105	Antarctica	2010	9.2	LL5
LaPaz Icefield 10106	LAP 10106	Antarctica	2010	9.7	H4
LaPaz Icefield 10107	LAP 10107	Antarctica	2010	12.2	LL5
LaPaz Icefield 10108	LAP 10108	Antarctica	2010	14.9	LL5
LaPaz Icefield 10109	LAP 10109	Antarctica	2010	7.4	L3.5
LaPaz Icefield 10110	LAP 10110	Antarctica	2010	16	L5
LaPaz Icefield 10111	LAP 10111	Antarctica	2010	17.5	LL5
LaPaz Icefield 10112	LAP 10112	Antarctica	2010	5.4	L5
LaPaz Icefield 10113	LAP 10113	Antarctica	2010	6.1	LL6
LaPaz Icefield 10114	LAP 10114	Antarctica	2010	5	LL5
LaPaz Icefield 10115	LAP 10115	Antarctica	2010	41	L6
LaPaz Icefield 10116	LAP 10116	Antarctica	2010	13.3	LL6
LaPaz Icefield 10117	LAP 10117	Antarctica	2010	21.3	H5
LaPaz Icefield 10118	LAP 10118	Antarctica	2010	2.7	LL6
LaPaz Icefield 10119	LAP 10119	Antarctica	2010	3.6	LL6
LaPaz Icefield 10130	LAP 10130	Antarctica	2010	352.6	EL6
LaPaz Icefield 10131	LAP 10131	Antarctica	2010	487.0	LL6
LaPaz Icefield 10132	LAP 10132	Antarctica	2010	519.0	LL5
LaPaz Icefield 10133	LAP 10133	Antarctica	2010	365.2	LL5
LaPaz Icefield 10134	LAP 10134	Antarctica	2010	482.9	LL6
LaPaz Icefield 10135	LAP 10135	Antarctica	2010	304.7	LL5
LaPaz Icefield 10136	LAP 10136	Antarctica	2010	418.6	LL5
LaPaz Icefield 10137	LAP 10137	Antarctica	2010	444.8	LL5
LaPaz Icefield 10138	LAP 10138	Antarctica	2010	353.9	LL5
LaPaz Icefield 10139	LAP 10139	Antarctica	2010	166.7	LL5
LaPaz Icefield 10140	LAP 10140	Antarctica	2010	67	LL5
LaPaz Icefield 10141	LAP 10141	Antarctica	2010	124.8	LL5
LaPaz Icefield 10142	LAP 10142	Antarctica	2010	102.3	LL5
LaPaz Icefield 10143	LAP 10143	Antarctica	2010	52.1	LL5
LaPaz Icefield 10144	LAP 10144	Antarctica	2010	43.7	LL5
LaPaz Icefield 10145	LAP 10145	Antarctica	2010	47.4	LL5
LaPaz Icefield 10146	LAP 10146	Antarctica	2010	76.6	LL5

LaPaz Icefield 10147	LAP 10147	Antarctica	2010	188.3	LL6
LaPaz Icefield 10148	LAP 10148	Antarctica	2010	106.1	L5
LaPaz Icefield 10149	LAP 10149	Antarctica	2010	193.8	LL5
LaPaz Icefield 10150	LAP 10150	Antarctica	2010	35.7	LL6
LaPaz Icefield 10151	LAP 10151	Antarctica	2010	52.6	LL5
LaPaz Icefield 10152	LAP 10152	Antarctica	2010	104.9	LL5
LaPaz Icefield 10153	LAP 10153	Antarctica	2010	46.6	LL6
LaPaz Icefield 10154	LAP 10154	Antarctica	2010	54.4	L5
LaPaz Icefield 10155	LAP 10155	Antarctica	2010	80.9	LL5
LaPaz Icefield 10156	LAP 10156	Antarctica	2010	41.3	LL5
LaPaz Icefield 10157	LAP 10157	Antarctica	2010	19.1	LL5
LaPaz Icefield 10158	LAP 10158	Antarctica	2010	30.8	LL5
LaPaz Icefield 10159	LAP 10159	Antarctica	2010	56.7	LL6
LaPaz Icefield 10160	LAP 10160	Antarctica	2010	42.6	LL6
LaPaz Icefield 10161	LAP 10161	Antarctica	2010	30.5	LL5
LaPaz Icefield 10162	LAP 10162	Antarctica	2010	13.5	L5
LaPaz Icefield 10163	LAP 10163	Antarctica	2010	12.5	LL5
LaPaz Icefield 10164	LAP 10164	Antarctica	2010	36.2	LL5
LaPaz Icefield 10165	LAP 10165	Antarctica	2010	18.6	LL6
LaPaz Icefield 10166	LAP 10166	Antarctica	2010	8.7	LL6
LaPaz Icefield 10167	LAP 10167	Antarctica	2010	16.2	LL5
LaPaz Icefield 10168	LAP 10168	Antarctica	2010	33.6	L5
LaPaz Icefield 10169	LAP 10169	Antarctica	2010	58.2	L5
LaPaz Icefield 10170	LAP 10170	Antarctica	2010	13.3	H5
LaPaz Icefield 10171	LAP 10171	Antarctica	2010	278.6	LL6
Larkman Nunatak 12002	LAR 12002	Antarctica	2012	4855	CV3
Larkman Nunatak 12010	LAR 12010	Antarctica	2012	409.6	Diogenite
Larkman Nunatak 12011	LAR 12011	Antarctica	2012	701.2	Martian (shergottite)
Larkman Nunatak 12049	LAR 12049	Antarctica	2012	23.1	CV3
Larkman Nunatak 12060	LAR 12060	Antarctica	2012	17.9	Eucrite
Larkman Nunatak 12095	LAR 12095	Antarctica	2012	133.1	Martian (shergottite)
Larkman Nunatak 12099	LAR 12099	Antarctica	2012	7	CO3
Larkman Nunatak 12100	LAR 12100	Antarctica	2012	24.6	CV3
Larkman Nunatak 12139	LAR 12139	Antarctica	2012	11.5	Howardite
Larkman Nunatak 12240	LAR 12240	Antarctica	2012	57.6	Martian (shergottite)
Larkman Nunatak 12246	LAR 12246	Antarctica	2012	22.1	CO3
Larkman Nunatak 12248	LAR 12248	Antarctica	2012	113.5	Diogenite
Larkman Nunatak 12249	LAR 12249	Antarctica	2012	80.1	Howardite
Larkman Nunatak 12320	LAR 12320	Antarctica	2012	120.1	Diogenite
Larkman Nunatak 12325	LAR 12325	Antarctica	2012	263.9	LL-imp melt
Larkman Nunatak 12326	LAR 12326	Antarctica	2012	10445	Howardite
Left Hand Creek		United States	Aug 2000	8671	Iron, IAB complex
Libaros		Argentina	28 May 2002	6000	H5
Lop Nur 001		China	2012 Nov 11	238.1	H4

Lop Nur 002		China	2012 Nov 11	31.5	H5
Los Vientos 005	LoV 005	Chile	2010 Jul 17	1431	H3
Los Vientos 006	LoV 006	Chile	2009 Dec 29	230	H4
Los Vientos 007	LoV 007	Chile	2010 Jan 20	701	H5/6
Los Vientos 008	LoV 008	Chile	2010 Sep 29	1617	H5
Los Vientos 009	LoV 009	Chile	2010 Oct 25	85	H5
Los Vientos 010	LoV 010	Chile	2011 Apr 13	6800	H5
Los Vientos 011	LoV 011	Chile	2011 Jun 21	300	L6
Los Vientos 012	LoV 012	Chile	2011 Jun 21	5117	H~5
Los Vientos 013	LoV 013	Chile	2011 Jun 21	2016	H6
Los Vientos 014	LoV 014	Chile	2011 Jul 3	565	L6
Los Vientos 015	LoV 015	Chile	2009 Dec 29	772	H3
Los Vientos 016	LoV 016	Chile	2009 Dec	1.9	LL3
Los Vientos 017	LoV 017	Chile	2011 Jun 24	109	Ureilite
Los Vientos 018	LoV 018	Chile	2010 Mar 22	308	L6
Los Vientos 019	LoV 019	Chile	2010 Jul 6	263	H4
Los Vientos 020	LoV 020	Chile	2010 Oct 25	8100	H4
Los Vientos 021	LoV 021	Chile	2011 Apr 20	161	L6
Los Vientos 022	LoV 022	Chile	2011 Jun 21	663	L6
Los Vientos 023	LoV 023	Chile	2011 Jun 21	7090	L6
Los Vientos 024	LoV 024	Chile	2011 Jul 1	333	L6
Los Vientos 025	LoV 025	Chile	2011 Jul 1	506	L6
Los Vientos 026	LoV 026	Chile	2011 Jul 3	203	L6
Los Vientos 027	LoV 027	Chile	2011 Jul 3	131	L6
Los Vientos 028	LoV 028	Chile	2012 Feb	12110	H5
Los Vientos 029	LoV 029	Chile	2012 Feb	329	L6
Los Vientos 030	LoV 030	Chile	2012 Feb	1489	H6
Los Vientos 031	LoV 031	Chile	2012 Feb	81	L6
Los Vientos 032	LoV 032	Chile	2009 Dec	29.4	H5
Los Vientos 033	LoV 033	Chile	2009 Dec	457	H6
Los Vientos 034	LoV 034	Chile	2011 Apr 15	212	L6
Los Vientos 035	LoV 035	Chile	2011 Apr 21	254	L6
Los Vientos 036	LoV 036	Chile	2011 Jun 21	601	H5
Los Vientos 037	LoV 037	Chile	2011 Jun 21	4789	H5
Los Vientos 038	LoV 038	Chile	2011 Jul 1	566	L6
Los Vientos 039	LoV 039	Chile	2011 Jul 2	180	L6
Los Vientos 040	LoV 040	Chile	2011 Jul 2	1021	L6
Los Vientos 041	LoV 041	Chile	2011 Jul 2	72	L6
Los Vientos 042	LoV 042	Chile	2011 Jul 3	42	L6
Los Vientos 043	LoV 043	Chile	2012 Feb	4.6	CR2
Los Vientos 044	LoV 044	Chile	2011 Jun 23	63	L6
Los Vientos 045	LoV 045	Chile	2010 Oct 25	11900	H4
Los Vientos 046	LoV 046	Chile	2010 Jul 18	5809	H5
Los Vientos 047	LoV 047	Chile	2010 Jul 7	11,074	L6

Los Vientos 048	LoV 048	Chile	2010 Sep 29	115	H6
Los Vientos 049	LoV 049	Chile	2010 Mar 21	2178	L6
Los Vientos 050	LoV 050	Chile	2010 Sept 30	888	H4
Los Vientos 052	LoV 052	Chile	2009 Dec	61.2	L3
Los Vientos 053	LoV 053	Chile	2011 Jul 1	968	H3
Los Vientos 054	LoV 054	Chile	2012 Jul 12	17.9	Eucrite-mmict
Los Vientos 055	LoV 055	Chile	2012 Jul 14	43.7	CO3
Los Vientos 056	LoV 056	Chile	2012 Feb	2932	H3-5
Los Vientos 057	LoV 057	Chile	2009 Dec	75	H3
Loulan Yizhi 001		China	2012 Nov 14	506.9	H4
Loulan Yizhi 002		China	2012 Nov 14	211.5	L4
Loulan Yizhi 003		China	2012 Nov 14	97.5	L4
Loulan Yizhi 004		China	2012 Nov 14	62.4	L4
Loulan Yizhi 005		China	2012 Nov 20	284.2	L4
Loulan Yizhi 006		China	2012 Nov 20	125.4	L4
Loulan Yizhi 007		China	2012 Nov 20	95.6	L4
Lucerne Valley 122	LV 122	United States	27 May 2012	2.3	H5
Mandalay Spring		United States	April 2012	2854	L6
Mantos Blancos 002		Chile	2011 Jul 19	6800	L6
Miller Range 11041	MIL 11041	Antarctica	2011	42.0	Eucrite-br
Miller Range 11097	MIL 11097	Antarctica	2011	69.6	CV3
Miller Range 11099	MIL 11099	Antarctica	2011	6.9	Diogenite
Miller Range 11197	MIL 11197	Antarctica	2011	39.3	Diogenite
Miller Range 11201	MIL 11201	Antarctica	2011	30.1	Diogenite
Miller Range 11291	MIL 11291	Antarctica	2011	102.1	Eucrite-br
Miller Range 11292	MIL 11292	Antarctica	2011	40.3	Eucrite-br
Miller Range 11294	MIL 11294	Antarctica	2011	3.8	Howardite
Miller Range 11296	MIL 11296	Antarctica	2011	74.2	Howardite
Mount Howe 10920	HOW 10920	Antarctica	2010	711.3	LL5
Mreïra		Mauritania	16 Dec 2012	6000	L6
Northwest Africa 231	NWA 231	(Northwest Africa)	2000	1054	L5
Northwest Africa 615	NWA 615	(Northwest Africa)		476	L6
Northwest Africa 2043	NWA 2043	(Northwest Africa)	P 2003 Aug	34.9	CK3
Northwest Africa 3197	NWA 3197	(Northwest Africa)	P 2010 Feb	324	Howardite
Northwest Africa 3339	NWA 3339	(Northwest Africa)	P 2006-Apr	711	Mesosiderite
Northwest Africa 4049	NWA 4049	(Northwest Africa)	P Oct 2003	1194	Mesosiderite-B2
Northwest Africa 4197	NWA 4197	(Northwest Africa)	P 2005 Oct 27	450	Eucrite-pmict
Northwest Africa 4522	NWA 4522	(Northwest Africa)	P Oct 2006	949	LL3
Northwest Africa 5339	NWA 5339	(Northwest Africa)	P 2007	30.3	CK5
Northwest Africa 5340	NWA 5340	(Northwest Africa)	P 2007	77.8	L6
Northwest Africa 5342	NWA 5342	(Northwest Africa)	P 2007	270.8	H6
Northwest Africa 5344	NWA 5344	(Northwest Africa)	P 2007	147.4	L4
Northwest Africa 5345	NWA 5345	(Northwest Africa)	P 2007	384	LL6
Northwest Africa 5346	NWA 5346	(Northwest Africa)	P 2007	123.5	H5

Northwest Africa 5347	NWA 5347	(Northwest Africa)	P 2006	163.4	L6
Northwest Africa 5348	NWA 5348	(Northwest Africa)	P 2008	396	CO3
Northwest Africa 5373	NWA 5373	(Northwest Africa)	P 2008	1443	L-melt rock
Northwest Africa 5377	NWA 5377	Morocco	P 2008	22	C3-ung
Northwest Africa 5580	NWA 5580	(Northwest Africa)	P 2007	10	CK4-an
Northwest Africa 5748	NWA 5748	(Northwest Africa)	P 2008 Dec 12	37	Howardite
Northwest Africa 5751	NWA 5751	(Northwest Africa)	P 2008 Dec 12	30	Howardite
Northwest Africa 5774	NWA 5774	(Northwest Africa)	P 2005 Jun	34	Eucrite-pmict
Northwest Africa 5777	NWA 5777	(Northwest Africa)	P February 2008	581.1	H5
Northwest Africa 5785	NWA 5785	(Northwest Africa)	P 2005 Feb	1800	Eucrite-pmict
Northwest Africa 5897	NWA 5897	(Northwest Africa)	P 2009	177.5	H4
Northwest Africa 5898	NWA 5898	(Northwest Africa)	P 2009	276.2	L6
Northwest Africa 5899	NWA 5899	(Northwest Africa)	P 2009	850.2	L5/6
Northwest Africa 5900	NWA 5900	(Northwest Africa)	P 2009	1216	H6
Northwest Africa 5926	NWA 5926	(Northwest Africa)	P 2009	228	CV3
Northwest Africa 6013	NWA 6013	(Northwest Africa)	P 2009 Oct 28	357	Diogenite-olivine
Northwest Africa 6030	NWA 6030	(Northwest Africa)	P 2009	728	CV3
Northwest Africa 6043	NWA 6043	(Northwest Africa)	P 2009	1220	CR2
Northwest Africa 6044	NWA 6044	(Northwest Africa)	P 2008	74.3	H5
Northwest Africa 6045	NWA 6045	(Northwest Africa)	P 2008	37.7	Ureilite
Northwest Africa 6046	NWA 6046	(Northwest Africa)	P 2008	67.15	H5
Northwest Africa 6047	NWA 6047	(Northwest Africa)	P 2009	264	CK3
Northwest Africa 6048	NWA 6048	(Northwest Africa)	P 2009	1004	Eucrite-pmict
Northwest Africa 6049	NWA 6049	(Northwest Africa)	P 2009	67.4	LL6
Northwest Africa 6050	NWA 6050	(Northwest Africa)	P 2009	147.9	Diogenite
Northwest Africa 6051	NWA 6051	(Northwest Africa)	P 2009	537	LL6
Northwest Africa 6052	NWA 6052	(Northwest Africa)	P 2009	38.81	LL6
Northwest Africa 6053	NWA 6053	(Northwest Africa)	P 2009	74.2	LL4-6
Northwest Africa 6054	NWA 6054	(Northwest Africa)	P 2009	935	LL6
Northwest Africa 6055	NWA 6055	(Northwest Africa)	P 2009	274	LL6
Northwest Africa 6082	NWA 6082	(Northwest Africa)	P 2008 Sep	85	LL3
Northwest Africa 6084	NWA 6084	(Northwest Africa)	P 2007	65	L3
Northwest Africa 6087	NWA 6087	(Northwest Africa)	P 2007	100	H3
Northwest Africa 6098	NWA 6098	(Northwest Africa)	P 2004	150	H3
Northwest Africa 6108	NWA 6108	(Northwest Africa)	P 2004	25000	L-melt rock
Northwest Africa 6111	NWA 6111	(Northwest Africa)	P 2004	51	L3
Northwest Africa 6148	NWA 6148	(Northwest Africa)	P 2009	270	Martian (nakhlite)
Northwest Africa 6258	NWA 6258	(Northwest Africa)	P 2009-May	1088	EL-melt rock
Northwest Africa 6260	NWA 6260	(Northwest Africa)	P 2010 Apr	1130	LL7
Northwest Africa 6301	NWA 6301	(Northwest Africa)	P 2009	253	Eucrite-pmict
Northwest Africa 6302	NWA 6302	(Northwest Africa)	P 2009	54.4	CK6
Northwest Africa 6307	NWA 6307	(Northwest Africa)	P 2009	47.9	Mesosiderite
Northwest Africa 6309	NWA 6309	(Northwest Africa)	P 2009	950	Eucrite-pmict

Northwest Africa 6310	NWA 6310	(Northwest Africa)	P 2009	167	CK3
Northwest Africa 6311	NWA 6311	(Northwest Africa)	P 2009	756	H3
Northwest Africa 6312	NWA 6312	(Northwest Africa)	P 2009	1496	Ureilite
Northwest Africa 6313	NWA 6313	(Northwest Africa)	P 2009	758	LL4-6
Northwest Africa 6315	NWA 6315	(Northwest Africa)	P 2007	184	Diogenite
Northwest Africa 6316	NWA 6316	(Northwest Africa)	P 2010	395.7	CV3
Northwest Africa 6317	NWA 6317	(Northwest Africa)	P 2010	1130	LL6
Northwest Africa 6318	NWA 6318	(Northwest Africa)	P 2010	23.2	Eucrite-pmict
Northwest Africa 6325	NWA 6325	(Northwest Africa)	P 2009	34.71	Eucrite-pmict
Northwest Africa 6348	NWA 6348	(Northwest Africa)	P 2010 Jul	134	L7
Northwest Africa 6377	NWA 6377	(Northwest Africa)	P 2010	21000	CV3
Northwest Africa 6422	NWA 6422	(Northwest Africa)	P 2010 Sep	310	L3.6
Northwest Africa 6425	NWA 6425	(Northwest Africa)	P 2010 Oct	1169	LL3.5
Northwest Africa 6426	NWA 6426	(Northwest Africa)	P 2010 Oct	361	LL7
Northwest Africa 6437	NWA 6437	Morocco	2009	305	CO3
Northwest Africa 6441	NWA 6441	(Northwest Africa)	P 2010	28.3	Ureilite
Northwest Africa 6451	NWA 6451	(Northwest Africa)	P 15 Jan 2009	411	Brachinite
Northwest Africa 6452	NWA 6452	(Northwest Africa)	P 2007 Jan	720	CV3
Northwest Africa 6472	NWA 6472	(Northwest Africa)	P 2010 Oct	71	LL3.2
Northwest Africa 6473	NWA 6473	(Northwest Africa)	P 2010 Sep	120.8	CO3
Northwest Africa 6479	NWA 6479	(Northwest Africa)	P 2010 Nov	450	LL3.5
Northwest Africa 6520	NWA 6520	(Northwest Africa)	P 2009	50	H4
Northwest Africa 6521	NWA 6521	(Northwest Africa)	P 2009	32	H5
Northwest Africa 6522	NWA 6522	(Northwest Africa)	P 2009	34	H5
Northwest Africa 6523	NWA 6523	(Northwest Africa)	P 2009	220	CV3
Northwest Africa 6524	NWA 6524	(Northwest Africa)	P 2009	200	H5
Northwest Africa 6525	NWA 6525	(Northwest Africa)	P 2009	50	L6
Northwest Africa 6526	NWA 6526	(Northwest Africa)	P 2009	500	H4
Northwest Africa 6527	NWA 6527	(Northwest Africa)	P 2009	75	L6
Northwest Africa 6528	NWA 6528	(Northwest Africa)	P 2009	40	H3
Northwest Africa 6529	NWA 6529	(Northwest Africa)	P 2009	160	CO3
Northwest Africa 6530	NWA 6530	(Northwest Africa)	P 2009	230	CO3
Northwest Africa 6531	NWA 6531	(Northwest Africa)	P 2009	100	H3
Northwest Africa 6567	NWA 6567	(Northwest Africa)	P 2010 Nov	6000	CV3
Northwest Africa 6568	NWA 6568	(Northwest Africa)	P 2010 Dec	58	Eucrite-mmict
Northwest Africa 6571	NWA 6571	(Northwest Africa)	P 2010 May	932	CV3
Northwest Africa 6574	NWA 6574	(Northwest Africa)	P 2010 Dec	647	Diogenite-pm
Northwest Africa 6577	NWA 6577	(Northwest Africa)	P 2011 Jan	770	Eucrite-pmict
Northwest Africa 6631	NWA 6631	(Northwest Africa)	P 2011 Feb	1200	L(LL)3
Northwest Africa 6700	NWA 6700	(Northwest Africa)	P 2011 Jan	32.6	CK4
Northwest Africa 6702	NWA 6702	(Northwest Africa)	P 2011 Jan	5614	CV3
Northwest Africa 6705	NWA 6705	(Northwest Africa)	P 2011 Mar	1003	Angrite
Northwest Africa 6717	NWA 6717	(Northwest Africa)	P 2010 Jan	159	CV3
Northwest Africa 6722	NWA 6722	(Northwest Africa)	P 2011 Feb	442.6	L3.5

Northwest Africa 6726	NWA 6726	(Northwest Africa)	P 2011 Jan	1836	CO3
Northwest Africa 6752	NWA 6752	Algeria	2000	21.39	H3
Northwest Africa 6769	NWA 6769	Algeria	2003	1616.0	H4
Northwest Africa 6771	NWA 6771	Algeria	2003	2032.0	H4
Northwest Africa 6774	NWA 6774	Western Sahara	2000	79.10	LL5
Northwest Africa 6775	NWA 6775	Western Sahara	2002	913	L6
Northwest Africa 6778	NWA 6778	Western Sahara	2003	349	L5
Northwest Africa 6779	NWA 6779	Western Sahara	2000	507.5	L6
Northwest Africa 6810	NWA 6810	Algeria	2003	2646.0	LL5
Northwest Africa 6822	NWA 6822	(Northwest Africa)	P 2010	174	LL6
Northwest Africa 6828	NWA 6828	(Northwest Africa)	P 2009	47	R3-6
Northwest Africa 6832	NWA 6832	(Northwest Africa)	P 2010	155	L6
Northwest Africa 6833	NWA 6833	(Northwest Africa)	P 2010	343	H4
Northwest Africa 6835	NWA 6835	(Northwest Africa)	P 2010	144	L4
Northwest Africa 6836	NWA 6836	(Northwest Africa)	P 2010	124	L4
Northwest Africa 6837	NWA 6837	(Northwest Africa)	P 2010	57	L6
Northwest Africa 6841	NWA 6841	(Northwest Africa)	P 2008	2800	L6
Northwest Africa 6843	NWA 6843	(Northwest Africa)	P 2009	1320	H4
Northwest Africa 6844	NWA 6844	(Northwest Africa)	P 2009	4800	L5
Northwest Africa 6845	NWA 6845	(Northwest Africa)	P 2009	210	H6
Northwest Africa 6846	NWA 6846	(Northwest Africa)	P 2009	1746	L6
Northwest Africa 6847	NWA 6847	(Northwest Africa)	P 2009	80	H4
Northwest Africa 6864	NWA 6864	(Northwest Africa)	P 2011 Apr	2061	L3.15
Northwest Africa 6866	NWA 6866	(Northwest Africa)	P 2011 Mar	966	H3.8
Northwest Africa 6867	NWA 6867	(Northwest Africa)	P 2011 Apr	325	LL3
Northwest Africa 6869	NWA 6869	(Northwest Africa)	P 2009 Jun	119	H3.9
Northwest Africa 6905	NWA 6905	(Northwest Africa)	P 2008	113.6	EL6
Northwest Africa 6906	NWA 6906	(Northwest Africa)	P 2008	140	EL6
Northwest Africa 6908	NWA 6908	Western Sahara	15 Mar 2010	52.68	CM2
Northwest Africa 6910	NWA 6910	(Northwest Africa)	P 2009 Sep	390	L3.3
Northwest Africa 6921	NWA 6921	(Northwest Africa)	P 2011 Aug	1749	CR6
Northwest Africa 6922	NWA 6922	(Northwest Africa)	P 2011 May	88	LL3.6
Northwest Africa 6924	NWA 6924	(Northwest Africa)	P 2011 Feb	290	LL3.4
Northwest Africa 6925	NWA 6925	(Northwest Africa)	P 2011 Mar	1300	L3.15
Northwest Africa 6930	NWA 6930	(Northwest Africa)	P 2011 Jun	151	H3.8
Northwest Africa 6933	NWA 6933	(Northwest Africa)	P 2010	835	Eucrite
Northwest Africa 6943	NWA 6943	(Northwest Africa)	P 2011 Jun 22	269	Eucrite-pmict
Northwest Africa 6945	NWA 6945	(Northwest Africa)	P 2010 May	240	Diogenite-pm
Northwest Africa 6954	NWA 6954	(Northwest Africa)	P 2011 Aug	157	L3.6
Northwest Africa 6957	NWA 6957	(Northwest Africa)	P 2011 Aug	256	CR2
Northwest Africa 6958	NWA 6958	(Northwest Africa)	P 2011 Jun	65.9	LL7
Northwest Africa 6960	NWA 6960	(Northwest Africa)	P 2011 Jun	441	OC3
Northwest Africa 7005	NWA 7005	(Northwest Africa)	P 2011 Sep	225	CO3
Northwest Africa 7006	NWA 7006	(Northwest Africa)	P 2011 Sep	335	CO3

Northwest Africa 7019	NWA 7019	(Northwest Africa)	P 2011 Feb	1316	L-melt rock
Northwest Africa 7020	NWA 7020	(Northwest Africa)	P 2011 Feb	715	CR2
Northwest Africa 7024	NWA 7024	(Northwest Africa)	P 2011 Apr	78	H7
Northwest Africa 7025	NWA 7025	(Northwest Africa)	P 2011 Apr	79	Mesosiderite
Northwest Africa 7027	NWA 7027	Morocco	P 2010	15997	CO3.1
Northwest Africa 7029	NWA 7029	Morocco	P 2009	205.6	LL3.10
Northwest Africa 7031	NWA 7031	(Northwest Africa)	P 2011 Jul	1200	LL3
Northwest Africa 7038	NWA 7038	(Northwest Africa)	P 2011 Nov	268	L3.5
Northwest Africa 7039	NWA 7039	(Northwest Africa)	P 2012 Jan	74.3	Diogenite
Northwest Africa 7058	NWA 7058	(Northwest Africa)	P 2006	13700	Ureilite
Northwest Africa 7059	NWA 7059	(Northwest Africa)	P 2008 Feb	11730	Ureilite
Northwest Africa 7118	NWA 7118	(Northwest Africa)	P 2011 Nov	22	L3.5
Northwest Africa 7124	NWA 7124	(Northwest Africa)	P 2011 Feb	712	Eucrite
Northwest Africa 7126	NWA 7126	(Northwest Africa)	P 2011 June	133	Ureilite
Northwest Africa 7127	NWA 7127	(Northwest Africa)	P 2011 Aug	71.45	Howardite
Northwest Africa 7143	NWA 7143	Morocco	2011	580	LL6
Northwest Africa 7144	NWA 7144	Morocco	2011	43418	H4
Northwest Africa 7146	NWA 7146	Morocco	2011	188	LL5
Northwest Africa 7147	NWA 7147	Morocco	2011	12918	LL3
Northwest Africa 7148	NWA 7148	Morocco	2011	3099	LL5
Northwest Africa 7149	NWA 7149	Morocco	2011	2318	H4
Northwest Africa 7150	NWA 7150	Morocco	2011	45326	H4
Northwest Africa 7151	NWA 7151	Morocco	2010	89	LL3
Northwest Africa 7183	NWA 7183	(Northwest Africa)	P 2007 Sep	175	Diogenite-pm
Northwest Africa 7184	NWA 7184	(Northwest Africa)	P 2009 Oct	775	CR2
Northwest Africa 7188	NWA 7188	(Northwest Africa)	P 2011 Sep	455	Eucrite
Northwest Africa 7193	NWA 7193	(Northwest Africa)	P 2012 Jan	107.8	Eucrite-an
Northwest Africa 7214	NWA 7214	Western Sahara	2006	2200	Aubrite
Northwest Africa 7215	NWA 7215	(Northwest Africa)	P 2010	500	L6
Northwest Africa 7216	NWA 7216	(Northwest Africa)	P 2010	70	Ureilite
Northwest Africa 7217	NWA 7217	(Northwest Africa)	P 2010	200	L3
Northwest Africa 7218	NWA 7218	(Northwest Africa)	P 2010	140	LL6
Northwest Africa 7219	NWA 7219	(Northwest Africa)	P 2010	520	L6
Northwest Africa 7220	NWA 7220	(Northwest Africa)	P 2011	310	L5
Northwest Africa 7221	NWA 7221	(Northwest Africa)	P 2011	150	L5
Northwest Africa 7222	NWA 7222	(Northwest Africa)	P 2011	180	Eucrite-pmict
Northwest Africa 7223	NWA 7223	(Northwest Africa)	P 2011	40	Eucrite-pmict
Northwest Africa 7224	NWA 7224	(Northwest Africa)	P 2010	26	Ureilite
Northwest Africa 7225	NWA 7225	(Northwest Africa)	P 2010	24	Ureilite-pmict
Northwest Africa 7226	NWA 7226	(Northwest Africa)	P 2011	1385	L3
Northwest Africa 7227	NWA 7227	(Northwest Africa)	P 2011	341	CV3
Northwest Africa 7228	NWA 7228	(Northwest Africa)	P 2011	2715	H4/5
Northwest Africa 7229	NWA 7229	(Northwest Africa)	P 2011	125	Eucrite-pmict
Northwest Africa 7230	NWA 7230	(Northwest Africa)	P 2011	34	diogenite

Northwest Africa 7231	NWA 7231	(Northwest Africa)	P 2011	191	Eucrite-pmict
Northwest Africa 7232	NWA 7232	(Northwest Africa)	P 2011	87	H4/5
Northwest Africa 7233	NWA 7233	(Northwest Africa)	P 2011	93	L5-melt breccia
Northwest Africa 7234	NWA 7234	(Northwest Africa)	P 2011	131	Eucrite-pmict
Northwest Africa 7263	NWA 7263	(Northwest Africa)	P 2012 Mar	100	Eucrite
Northwest Africa 7265	NWA 7265	(Northwest Africa)	P 2012 Mar	130	CR2
Northwest Africa 7266	NWA 7266	(Northwest Africa)	P 2012 Feb	1206	Eucrite
Northwest Africa 7270	NWA 7270	(Northwest Africa)	P 2012 Feb	863	Eucrite
Northwest Africa 7287	NWA 7287	(Northwest Africa)	2011	2564	LL3-6
Northwest Africa 7288	NWA 7288	(Northwest Africa)	2011	256.1	LL6
Northwest Africa 7289	NWA 7289	(Northwest Africa)	2011	40.8	R4
Northwest Africa 7290	NWA 7290	(Northwest Africa)	2011	52.3	Ureilite
Northwest Africa 7291	NWA 7291	Mauritania	2011	681	R3-5
Northwest Africa 7292	NWA 7292	Mauritania	2011	9.9	Eucrite
Northwest Africa 7293	NWA 7293	Mauritania	2011	1034	H5
Northwest Africa 7294	NWA 7294	Mauritania	2011	209	Ureilite
Northwest Africa 7295	NWA 7295	Mauritania	2011	995	H5
Northwest Africa 7296	NWA 7296	Western Sahara	2012	62.3	H5
Northwest Africa 7297	NWA 7297	(Northwest Africa)	P 2010	78.5	Brachinite
Northwest Africa 7306	NWA 7306	(Northwest Africa)	P 2011 Mar	54.7	CM-an
Northwest Africa 7307	NWA 7307	(Northwest Africa)	P 2012 Feb	80.2	CK4
Northwest Africa 7309	NWA 7309	(Northwest Africa)	P 2012 Mar	36.2	CM2
Northwest Africa 7310	NWA 7310	(Northwest Africa)	P 2012 Feb	89	CK4
Northwest Africa 7311	NWA 7311	(Northwest Africa)	P 2012 Apr	732	CO3
Northwest Africa 7316	NWA 7316	(Northwest Africa)	P 2012 Apr	153	H5
Northwest Africa 7317	NWA 7317	(Northwest Africa)	P 2012	1096	CR6
Northwest Africa 7321	NWA 7321	(Northwest Africa)	P 2012 Apr	109	Acapulcoite
Northwest Africa 7322	NWA 7322	(Northwest Africa)	P 2012 Apr	109	H4
Northwest Africa 7323	NWA 7323	(Northwest Africa)	P 2012 Apr	501	LL3
Northwest Africa 7337	NWA 7337	(Northwest Africa)	P June 2011	86	LL4
Northwest Africa 7338	NWA 7338	(Northwest Africa)	P June 2011	58	LL4
Northwest Africa 7339	NWA 7339	(Northwest Africa)	P June 2011	243	L5
Northwest Africa 7340	NWA 7340	(Northwest Africa)	P June 2011	49.7	L4
Northwest Africa 7341	NWA 7341	(Northwest Africa)	P June 2011	56	L4
Northwest Africa 7342	NWA 7342	(Northwest Africa)	P June 2011	55	H4
Northwest Africa 7343	NWA 7343	(Northwest Africa)	P June 2011	450	L4
Northwest Africa 7345	NWA 7345	(Northwest Africa)	P June 2011	314	L4
Northwest Africa 7387	NWA 7387	(Northwest Africa)	P 2012	392	Martian (shergottite)
Northwest Africa 7388	NWA 7388	(Northwest Africa)	P 2007	50.8	Brachinite
Northwest Africa 7396	NWA 7396	(Northwest Africa)	P 2012 Jun	165.6	CO3
Northwest Africa 7397	NWA 7397	(Northwest Africa)	P 2012 Jun	2130	Martian (shergottite)
Northwest Africa 7399	NWA 7399	(Northwest Africa)	P 2012 Apr	257.8	Ureilite
Northwest Africa 7400	NWA 7400	(Northwest Africa)	P 2012 May	138	Eucrite-mmict
Northwest Africa 7415	NWA 7415	Mauritania	2011	40.5	Eucrite

Northwest Africa 7416	NWA 7416	Mauritania	2011	19.1	Howardite
Northwest Africa 7417	NWA 7417	Mauritania	P 2012	37000	L6
Northwest Africa 7418	NWA 7418	Mauritania	2011	215.7	LL6-melt breccia
Northwest Africa 7419	NWA 7419	Mauritania	2012	386	H~6
Northwest Africa 7420	NWA 7420	(Northwest Africa)	P 2012 Feb	99.8	CK5
Northwest Africa 7421	NWA 7421	(Northwest Africa)	P 2012 Feb	78.7	L~6
Northwest Africa 7422	NWA 7422	(Northwest Africa)	P 2012 Feb	249.3	LL~5
Northwest Africa 7423	NWA 7423	(Northwest Africa)	before 2009	11.5	LL~6
Northwest Africa 7424	NWA 7424	(Northwest Africa)	before 2009	5.3	L~6
Northwest Africa 7425	NWA 7425	(Northwest Africa)	before 2009	11.3	L~6
Northwest Africa 7441	NWA 7441	(Northwest Africa)	P 2004	340.18	LL3.4
Northwest Africa 7442	NWA 7442	(Northwest Africa)	P 2004	295.48	H4
Northwest Africa 7443	NWA 7443	(Northwest Africa)	P 2004	144.56	LL4
Northwest Africa 7444	NWA 7444	(Northwest Africa)	P 2004	362.91	H5
Northwest Africa 7451	NWA 7451	(Northwest Africa)	P 2012 Aug	2100	L6-melt breccia
Northwest Africa 7452	NWA 7452	(Northwest Africa)	P 2012 Aug	1844	L5
Northwest Africa 7453	NWA 7453	(Northwest Africa)	P 2012 Aug	128	Eucrite
Northwest Africa 7454	NWA 7454	(Northwest Africa)	P 2012 Aug	6000	CV3
Northwest Africa 7455	NWA 7455	(Northwest Africa)	P 2012 Aug	648	H4
Northwest Africa 7456	NWA 7456	(Northwest Africa)	P 2012 Aug	2282	L5
Northwest Africa 7457	NWA 7457	(Northwest Africa)	P 2012 Aug	15500	L5-melt breccia
Northwest Africa 7458	NWA 7458	(Northwest Africa)	P 2012 Aug	15000	L5-melt breccia
Northwest Africa 7459	NWA 7459	(Northwest Africa)	P 2012 Aug	264	LL4
Northwest Africa 7460	NWA 7460	(Northwest Africa)	P 2012 Aug	1481	L4
Northwest Africa 7461	NWA 7461	(Northwest Africa)	P 2012 Aug	1199	CK4
Northwest Africa 7462	NWA 7462	(Northwest Africa)	P 2012 Aug	1521	L4
Northwest Africa 7464	NWA 7464	(Northwest Africa)	P 2012 Jul	2263	Diogenite
Northwest Africa 7465	NWA 7465	(Northwest Africa)	P 2012 July	487	Eucrite-mmict
Northwest Africa 7466	NWA 7466	(Northwest Africa)	P 2012 Jul	1216	Eucrite-mmict
Northwest Africa 7467	NWA 7467	(Northwest Africa)	P 2012 Jul	108.7	Diogenite-pm
Northwest Africa 7468	NWA 7468	(Northwest Africa)	P 2012 May	964	L3
Northwest Africa 7469	NWA 7469	(Northwest Africa)	P 2012 Jun	495	L3
Northwest Africa 7471	NWA 7471	(Northwest Africa)	P 2012 Aug	241.9	CO3
Northwest Africa 7472	NWA 7472	(Northwest Africa)	P 2012 Aug	122.3	CK5
Northwest Africa 7473	NWA 7473	(Northwest Africa)	P 2012 Aug	3254	Ureilite
Northwest Africa 7474	NWA 7474	(Northwest Africa)	P 2012 Aug	348	Lodranite
Northwest Africa 7475	NWA 7475	(Northwest Africa)	P 2012 Sep	80.2	Martian (basaltic breccia)
Northwest Africa 7500	NWA 7500	Mali	P 2012 Mar	2040	Martian (shergottite)
Northwest Africa 7501	NWA 7501	(Northwest Africa)	P 2012 Sep	715.5	Eucrite-mmict
Northwest Africa 7502	NWA 7502	(Northwest Africa)	P 2012 Oct	882	CR2
Northwest Africa 7503	NWA 7503	(Northwest Africa)	P 2012 Feb	572	L5-6
Northwest Africa 7504	NWA 7504	(Northwest Africa)	P 2012 Feb	1680	L6
Northwest Africa 7505	NWA 7505	(Northwest Africa)	P 2003	45.75	L5

Northwest Africa 7506	NWA 7506	(Northwest Africa)	P 2003	106.3	H5
Northwest Africa 7507	NWA 7507	(Northwest Africa)	P 2003	35.1	L5
Northwest Africa 7508	NWA 7508	(Northwest Africa)	P 2003	280.5	L4
Northwest Africa 7509	NWA 7509	(Northwest Africa)	P 2003	51.6	L5
Northwest Africa 7521	NWA 7521	(Northwest Africa)	P 2010 Feb	610	L6-melt breccia
Northwest Africa 7522	NWA 7522	(Northwest Africa)	P 2007	126.8	H4
Northwest Africa 7523	NWA 7523	(Northwest Africa)	P 2007	614.6	L5
Northwest Africa 7524	NWA 7524	(Northwest Africa)	P 2007	759	L5
Northwest Africa 7525	NWA 7525	(Northwest Africa)	P 2008	73.4	L5
Northwest Africa 7526	NWA 7526	(Northwest Africa)	P 2006	34.2	H6
Northwest Africa 7527	NWA 7527	(Northwest Africa)	P 2007	80	L5
Northwest Africa 7528	NWA 7528	(Northwest Africa)	P 2007	154.2	L5
Northwest Africa 7529	NWA 7529	(Northwest Africa)	P 2007	189.3	L5
Northwest Africa 7530	NWA 7530	(Northwest Africa)	P 2003	254	L6
Northwest Africa 7534	NWA 7534	Morocco	P Aug 2012	736	H6-melt breccia
Northwest Africa 7535	NWA 7535	(Northwest Africa)	P 2011 Nov	810	R3-6
Northwest Africa 7536	NWA 7536	(Northwest Africa)	P 2012 Mar	29	Howardite
Northwest Africa 7537	NWA 7537	(Northwest Africa)	P 2012 May	76	Howardite
Northwest Africa 7538	NWA 7538	(Northwest Africa)	P 2012 Mar	826	LL5/6
Northwest Africa 7539	NWA 7539	(Northwest Africa)	P 2012 May	299	L6
Northwest Africa 7542	NWA 7542	(Northwest Africa)	P 2012 Jun 21	107	Eucrite-pmict
Northwest Africa 7543	NWA 7543	(Northwest Africa)	P 2012 Jun 21	137	Eucrite-pmict
Northwest Africa 7544	NWA 7544	(Northwest Africa)	P 2012 Jun 21	128	H5
Northwest Africa 7545	NWA 7545	(Northwest Africa)	P 2012, Mar	1620	LL4
Northwest Africa 7549	NWA 7549	(Northwest Africa)	P 2012	77.3	Eucrite-mmict
Northwest Africa 7550	NWA 7550	Morocco	P 2012	225	CK4
Northwest Africa 7551	NWA 7551	Morocco	P 2012	830	Eucrite-mmict
Northwest Africa 7552	NWA 7552	Morocco	P 2012	1200	Eucrite-mmict
Northwest Africa 7555	NWA 7555	Morocco	P 2012	300	Eucrite
Northwest Africa 7558	NWA 7558	(Northwest Africa)	P 2011	89	R3-5
Northwest Africa 7567	NWA 7567	(Northwest Africa)	P 2012	181	L3
Northwest Africa 7571	NWA 7571	(Northwest Africa)	P 2012	754	Eucrite-pmict
Northwest Africa 7572	NWA 7572	(Northwest Africa)	P 2012	56	CV3
Northwest Africa 7573	NWA 7573	(Northwest Africa)	P 2012	45	CK3
Northwest Africa 7574	NWA 7574	(Northwest Africa)	P 2012	90	Eucrite-pmict
Northwest Africa 7576	NWA 7576	(Northwest Africa)	P 14 Dec 2011	277	Howardite
Northwest Africa 7577	NWA 7577	(Northwest Africa)	P 2012	31	H3
Northwest Africa 7579	NWA 7579	(Northwest Africa)	P 2012	264	L6-melt breccia
Northwest Africa 7580	NWA 7580	(Northwest Africa)	P 2012	782	L-melt breccia
Northwest Africa 7581	NWA 7581	(Northwest Africa)	P 2012	420	L3
Northwest Africa 7583	NWA 7583	(Northwest Africa)	P 2012	40	L3
Northwest Africa 7585	NWA 7585	(Northwest Africa)	P 2012	2442	L6-melt breccia
Northwest Africa 7586	NWA 7586	(Northwest Africa)	P 2012	51	L-melt rock
Northwest Africa 7589	NWA 7589	(Northwest Africa)	P 2012	864	CV3

Northwest Africa 7590	NWA 7590	(Northwest Africa)	P 2012	51	L3
Northwest Africa 7592	NWA 7592	(Northwest Africa)	P 2009	825	R3
Northwest Africa 7593	NWA 7593	(Northwest Africa)	P 2003	81.4	H4
Northwest Africa 7594	NWA 7594	(Northwest Africa)	P 2003	176.5	L6
Northwest Africa 7595	NWA 7595	(Northwest Africa)	P 2003	320.8	L6
Northwest Africa 7596	NWA 7596	(Northwest Africa)	P 2003	255.1	L6
Northwest Africa 7597	NWA 7597	(Northwest Africa)	P 2003	146.4	L6
Northwest Africa 7598	NWA 7598	(Northwest Africa)	P 2003	97.5	L6
Northwest Africa 7599	NWA 7599	(Northwest Africa)	P 2012	343	Diogenite
Northwest Africa 7600	NWA 7600	(Northwest Africa)	P 2012	72	Ureilite
Northwest Africa 7601	NWA 7601	(Northwest Africa)	P 2012	59	Acapulcoite
Northwest Africa 7602	NWA 7602	(Northwest Africa)	P 2012	71	EL6
Northwest Africa 7603	NWA 7603	(Northwest Africa)	P 2012	126.9	Enst achon
Northwest Africa 7605	NWA 7605	(Northwest Africa)	P 2012	320	Brachinite
Northwest Africa 7606	NWA 7606	Morocco	P Aug 2012	159	LL3.4
Northwest Africa 7607	NWA 7607	Morocco	P Aug 2012	111	LL3.4
Northwest Africa 7608	NWA 7608	Morocco	P August 2012	413	Diogenite
Northwest Africa 7609	NWA 7609	Morocco	P August 2012	249	Eucrite
Northwest Africa 7611	NWA 7611	Morocco	May 2012	916	Lunar
Northwest Africa 7612	NWA 7612	(Northwest Africa)	P 2011	193	LL4
Northwest Africa 7613	NWA 7613	(Northwest Africa)	P 2011	222	CV3
Northwest Africa 7614	NWA 7614	(Northwest Africa)	P 2011	226	LL3
Northwest Africa 7615	NWA 7615	Morocco	P Aug 2012	1100	CK6
Northwest Africa 7620	NWA 7620	(Northwest Africa)	P 2011	147	EL6
Northwest Africa 7622	NWA 7622	(Northwest Africa)	P 2011	61	H3
Northwest Africa 7625	NWA 7625	(Northwest Africa)	P 2011	99.5	H4
Northwest Africa 7626	NWA 7626	(Northwest Africa)	P 2011	60	H-melt breccia
Northwest Africa 7627	NWA 7627	(Northwest Africa)	P 2011	31	H-melt breccia
Northwest Africa 7628	NWA 7628	(Northwest Africa)	P 2011	19.7	L5
Northwest Africa 7629	NWA 7629	(Northwest Africa)	P 2007 Dec 16	148	L~5
Northwest Africa 7630	NWA 7630	(Northwest Africa)	P 2012 Oct	760	Ureilite
Northwest Africa 7632	NWA 7632	(Northwest Africa)	P 2012 Sep	47.1	CO3
Northwest Africa 7633	NWA 7633	(Northwest Africa)	P 2012	36	CO3
Northwest Africa 7635	NWA 7635	(Northwest Africa)	P 2012 May	195.8	Martian (shergottite)
Northwest Africa 7636	NWA 7636	(Northwest Africa)	P 2012 Oct	368	R4
Northwest Africa 7637	NWA 7637	(Northwest Africa)	P 2010	84.9	Enst achon
Northwest Africa 7638	NWA 7638	(Northwest Africa)	P 2006 Feb	62.8	L4
Northwest Africa 7640	NWA 7640	(Northwest Africa)	P 2012 Nov	1106	Brachinite
Northwest Africa 7641	NWA 7641	(Northwest Africa)	P 2012 Oct	393.5	Mesosiderite
Northwest Africa 7646	NWA 7646	(Northwest Africa)	P 2012 Dec	402	L3
Northwest Africa 7648	NWA 7648	(Northwest Africa)	P 2012 Jan	145	LL4
Northwest Africa 7649	NWA 7649	(Northwest Africa)	P 2012 Jan	270	H4
Northwest Africa 7650	NWA 7650	(Northwest Africa)	P 2012 Jan	11115	L6
Northwest Africa 7651	NWA 7651	Morocco	P 2012	2480	Eucrite-cm

Northwest Africa 7652	NWA 7652	Morocco	P Aug 2012	247	L3.6
Northwest Africa 7653	NWA 7653	Morocco	P Aug 2012	106	L5
Northwest Africa 7654	NWA 7654	Morocco	P Aug 2012	6288	L5
Northwest Africa 7655	NWA 7655	Morocco	P Aug 2012	250	CR2
Northwest Africa 7656	NWA 7656	Morocco	P Aug 2012	2230	L3.3
Northwest Africa 7657	NWA 7657	Morocco	P Nov 2012	2280	Mesosiderite
Northwest Africa 7658	NWA 7658	Morocco	P Aug 2012	109	L3.5
Northwest Africa 7659	NWA 7659	Morocco	P 2011	295.7	H4
Northwest Africa 7661	NWA 7661	Morocco	2011	100	L5
Northwest Africa 7662	NWA 7662	Western Sahara	May 2011	882	L5
Northwest Africa 7663	NWA 7663	Morocco	P May 2011	276.6	LL5-6
Northwest Africa 7664	NWA 7664	Morocco	P Oct 2002	897	L5-6
Northwest Africa 7666	NWA 7666	(Northwest Africa)	P 2012 Dec	442	LL6
Northwest Africa 7667	NWA 7667	(Northwest Africa)	P 2012 Dec	172	L4
Northwest Africa 7668	NWA 7668	(Northwest Africa)	P 2012 Dec	2500	H4
Northwest Africa 7671	NWA 7671	(Northwest Africa)	P 2012 Dec	73	Mesosiderite
Northwest Africa 7674	NWA 7674	(Northwest Africa)	P 2012 Dec	225	Lodranite
Northwest Africa 7675	NWA 7675	(Northwest Africa)	P 2012 Dec	663	L5
Northwest Africa 7677	NWA 7677	(Northwest Africa)	P 2012 Aug	280	Diogenite
Northwest Africa 7678	NWA 7678	Morocco	P 2012 Aug	4236	CV3
Northwest Africa 7679	NWA 7679	Morocco	P 2012	241	L6
Northwest Africa 7680	NWA 7680	(Northwest Africa)	P Jan 2011	123.72	Achondrite-ung
Northwest Africa 7681	NWA 7681	Morocco	P 2012	846	LL5
Northwest Africa 7682	NWA 7682	Morocco	P 2012	73	Eucrite
Northwest Africa 7683	NWA 7683	Morocco	P 2012	609	L3.6
Northwest Africa 7684	NWA 7684	Morocco	2011	314	H4
Northwest Africa 7685	NWA 7685	(Northwest Africa)	P 2005	73.9	H6
Northwest Africa 7686	NWA 7686	Morocco	P 2012 Aug	3146	Ureilite
Northwest Africa 7687	NWA 7687	(Northwest Africa)	P 2011	288	L5-6
Northwest Africa 7688	NWA 7688	(Northwest Africa)	P 2011	232	LL3
Northwest Africa 7689	NWA 7689	(Northwest Africa)	P 2011	181	L3
Northwest Africa 7690	NWA 7690	(Northwest Africa)	P 2011	125	CV3
Northwest Africa 7691	NWA 7691	(Northwest Africa)	P 2011	275	LL6
Northwest Africa 7692	NWA 7692	(Northwest Africa)	P 2012	444	CV3
Northwest Africa 7693	NWA 7693	(Northwest Africa)	P 2012	3800	L5
Northwest Africa 7694	NWA 7694	(Northwest Africa)	P 2012	1316	H5
Northwest Africa 7695	NWA 7695	(Northwest Africa)	P 2012	50	CO3
Northwest Africa 7696	NWA 7696	(Northwest Africa)	P 2012	120	CK6
Northwest Africa 7697	NWA 7697	(Northwest Africa)	P 2012	100	CV3
Northwest Africa 7698	NWA 7698	(Northwest Africa)	P 2012	15	Ureilite
Northwest Africa 7699	NWA 7699	(Northwest Africa)	1 Aug 2010	81	H6
Northwest Africa 7700	NWA 7700	Western Sahara	P 22 Sep 2010	64	L3
Northwest Africa 7701	NWA 7701	(Northwest Africa)	2010	55	CK6
Northwest Africa 7702	NWA 7702	(Northwest Africa)	2011	50	Eucrite-pmict

Northwest Africa 7703	NWA 7703	(Northwest Africa)	2011	123	H6
Northwest Africa 7704	NWA 7704	(Northwest Africa)	2011	56	CK5
Northwest Africa 7705	NWA 7705	(Northwest Africa)	2012	124	Eucrite-pmict
Northwest Africa 7706	NWA 7706	(Northwest Africa)	2012	279	Eucrite-pmict
Northwest Africa 7707	NWA 7707	(Northwest Africa)	2012	2441	L6
Northwest Africa 7708	NWA 7708	(Northwest Africa)	2012	87	Mesosiderite
Northwest Africa 7709	NWA 7709	(Northwest Africa)	2012	115	R3
Northwest Africa 7710	NWA 7710	(Northwest Africa)	2012	211	LL5
Northwest Africa 7711	NWA 7711	(Northwest Africa)	2012	487	LL5-6
Northwest Africa 7712	NWA 7712	(Northwest Africa)	2012	53	R3-6
Northwest Africa 7713	NWA 7713	(Northwest Africa)	Dec 2011	1255	H5
Northwest Africa 7714	NWA 7714	(Northwest Africa)	P 2012	119	Howardite
Northwest Africa 7715	NWA 7715	(Northwest Africa)	P 2012 Jun	3200	H6
Northwest Africa 7716	NWA 7716	(Northwest Africa)	P 2012 Jan	2517	Pallasite
Northwest Africa 7717	NWA 7717	(Northwest Africa)	P 2012 Aug	85	H4
Northwest Africa 7720	NWA 7720	(Northwest Africa)	P 2012 Dec	2500	H4
Northwest Africa 7721	NWA 7721	(Northwest Africa)	P 2012 Dec	32	Martian (shergottite)
Northwest Africa 7722	NWA 7722	(Northwest Africa)	P 2012 Dec	155	L6
Northwest Africa 7723	NWA 7723	(Northwest Africa)	P 2012-Dec	300	EL6
Northwest Africa 7724	NWA 7724	(Northwest Africa)	P 2012 Dec	1000	L6
Northwest Africa 7728	NWA 7728	(Northwest Africa)	P 2013 Feb	44	R4
Northwest Africa 7729	NWA 7729	Morocco	P 2012	250	LL5
Northwest Africa 7730	NWA 7730	Morocco	P 2012	373	LL3.4
Northwest Africa 7731	NWA 7731	Morocco	P 2012	81	L3.00
Northwest Africa 7732	NWA 7732	Morocco	P Aug 2012	550	H6
Northwest Africa 7733	NWA 7733	(Northwest Africa)	P 2012	1835	LL5-6
Northwest Africa 7734	NWA 7734	(Northwest Africa)	P 2012	1900	LL4-6
Northwest Africa 7735	NWA 7735	(Northwest Africa)	P 2012	210	L4
Northwest Africa 7736	NWA 7736	(Northwest Africa)	P 2012	490	LL6
Northwest Africa 7737	NWA 7737	(Northwest Africa)	P 2012	874	L6
Northwest Africa 7738	NWA 7738	(Northwest Africa)	P 2012	868	L6
Northwest Africa 7739	NWA 7739	(Northwest Africa)	P 2012	140	L3
Northwest Africa 7740	NWA 7740	(Northwest Africa)	P 2012	32	H4
Northwest Africa 7741	NWA 7741	(Northwest Africa)	P 2012	70	H6
Northwest Africa 7742	NWA 7742	(Northwest Africa)	P 2012	112	H4
Northwest Africa 7743	NWA 7743	(Northwest Africa)	P 2010	320	H4/5
Northwest Africa 7744	NWA 7744	(Northwest Africa)	P 2012	150	L3
Northwest Africa 7745	NWA 7745	(Northwest Africa)	P 2012	250	LL3
Northwest Africa 7746	NWA 7746	(Northwest Africa)	P 2012	15	LL6
Northwest Africa 7747	NWA 7747	(Northwest Africa)	P 2012	70	Eucrite-pmict
Northwest Africa 7748	NWA 7748	(Northwest Africa)	P 2012	300	LL4-6
Northwest Africa 7749	NWA 7749	(Northwest Africa)	P 2012	25	Ureilite
Northwest Africa 7750	NWA 7750	(Northwest Africa)	P 2012	10	Ureilite
Northwest Africa 7751	NWA 7751	(Northwest Africa)	P 2010	20000	L5

Northwest Africa 7752	NWA 7752	(Northwest Africa)	P 2011	160	LL4-6
Northwest Africa 7753	NWA 7753	(Northwest Africa)	P 2011	2600	LL6
Northwest Africa 7754	NWA 7754	(Northwest Africa)	P 2012	305	CK5
Northwest Africa 7755	NWA 7755	Morocco	P 2013	30	Martian (shergottite)
Northwest Africa 7756	NWA 7756	Mali	P 2010	124	Eucrite
Northwest Africa 7757	NWA 7757	Morocco	P 2012	13000	H5
Northwest Africa 7758	NWA 7758	(Northwest Africa)	P 2011	80	L5
Northwest Africa 7759	NWA 7759	(Northwest Africa)	P 2011	730	H5
Northwest Africa 7760	NWA 7760	(Northwest Africa)	P 2011	461	H6
Northwest Africa 7761	NWA 7761	(Northwest Africa)	P 2011	91	H5
Northwest Africa 7762	NWA 7762	(Northwest Africa)	P 2011	269	L5
Northwest Africa 7763	NWA 7763	(Northwest Africa)	P 2011	95	H4
Northwest Africa 7764	NWA 7764	(Northwest Africa)	P 2011	31.5	L5
Northwest Africa 7765	NWA 7765	(Northwest Africa)	P 2011	49.8	H4
Northwest Africa 7766	NWA 7766	(Northwest Africa)	P 2011	71.9	EL6
Northwest Africa 7769	NWA 7769	(Northwest Africa)	P 2011	30.1	H6
Northwest Africa 7770	NWA 7770	(Northwest Africa)	P 2012	4920	H5
Northwest Africa 7771	NWA 7771	(Northwest Africa)	P 2012	220.5	H5
Northwest Africa 7772	NWA 7772	(Northwest Africa)	P 2012	29.2	L5
Northwest Africa 7773	NWA 7773	(Northwest Africa)	P 2012	33.2	H4
Northwest Africa 7776	NWA 7776	(Northwest Africa)	P Nov. 2012	2073	L5
Northwest Africa 7777	NWA 7777	Morocco	P 2012	1352.3	H3.8
Northwest Africa 7778	NWA 7778	Morocco	P 2012	235.8	LL4-6
Northwest Africa 7779	NWA 7779	Morocco	P 2012	49.3	Eucrite
Northwest Africa 7780	NWA 7780	Morocco	P 2012	26.9	Eucrite
Northwest Africa 7781	NWA 7781	Morocco	P 2012	646.90	L4
Northwest Africa 7782	NWA 7782	Morocco	P 2012	127.80	LL4
Northwest Africa 7783	NWA 7783	Morocco	P 2012	190.20	H6
Northwest Africa 7784	NWA 7784	Morocco	P 2012	299.70	H5
Northwest Africa 7785	NWA 7785	Morocco	P 2012	600.7	L6
Northwest Africa 7786	NWA 7786	Morocco	P 2012	298.1	LL6
Northwest Africa 7789	NWA 7789	(Northwest Africa)	P Mar 2011	8200	LL4
Northwest Africa 7809	NWA 7809	(Northwest Africa)	P 2013 Feb	230	Aubrite
Northwest Africa 7812	NWA 7812	(Northwest Africa)	P 2013 Mar	46.2	Angrite
Northwest Africa 7815	NWA 7815	(Northwest Africa)	P 2013 Feb	146	CO3.1
Northwest Africa 7816	NWA 7816	(Northwest Africa)	P 2013 Feb	2493	L4
Northwest Africa 7817	NWA 7817	(Northwest Africa)	P 2013 Feb	1334	L4
Northwest Africa 7818	NWA 7818	(Northwest Africa)	P 2013 Feb	167	LL5
Northwest Africa 7820	NWA 7820	(Northwest Africa)	P 2013 Feb	53	LL6
Northwest Africa 7821	NWA 7821	(Northwest Africa)	P 2013 Feb	38	C2-ung
Northwest Africa 7822	NWA 7822	(Northwest Africa)	P 2013 Feb	45.8	Achondrite-ung
Northwest Africa 7824	NWA 7824	(Northwest Africa)	P 2011 Oct	59	Mesosiderite
Northwest Africa 7825	NWA 7825	(Northwest Africa)	P 2012 Aug 19	20.15	Diogenite
Northwest Africa 7826	NWA 7826	(Northwest Africa)	P 2012 Oct	30.3	LL6

Northwest Africa 7827	NWA 7827	(Northwest Africa)	P 2013 Jan	467.6	L4
Northwest Africa 7828	NWA 7828	(Northwest Africa)	P 2013 Mar	4772	Brachinite
Northwest Africa 7830	NWA 7830	(Northwest Africa)	P 2013 Mar	2700	CK3
Northwest Africa 7832	NWA 7832	(Northwest Africa)	P 2012	11922	H6
Northwest Africa 7834	NWA 7834	(Northwest Africa)	P 2013 Feb	905	Lunar (feldsp. breccia)
Northwest Africa 7837	NWA 7837	Morocco	P 2012	586	CR2
Northwest Africa 7838	NWA 7838	(Northwest Africa)	P 2012	120.8	H3
Northwest Africa 7839	NWA 7839	(Northwest Africa)	P 2012	2300	LL5
Northwest Africa 7840	NWA 7840	(Northwest Africa)	P 2012	112	LL3.6
Northwest Africa 7841	NWA 7841	(Northwest Africa)	P 2012	1070	L6
Northwest Africa 7842	NWA 7842	(Northwest Africa)	P 2012	365	H6
Northwest Africa 7843	NWA 7843	(Northwest Africa)	P 2012	236	H5
Northwest Africa 7844	NWA 7844	(Northwest Africa)	P 2012	32	L3
Northwest Africa 7845	NWA 7845	(Northwest Africa)	P 2012	44	CO3
Northwest Africa 7846	NWA 7846	(Northwest Africa)	P 2012	49	CV3
Northwest Africa 7847	NWA 7847	(Northwest Africa)	P 2012	264	H3
Northwest Africa 7848	NWA 7848	(Northwest Africa)	P 2012	66	CO3
Northwest Africa 7849	NWA 7849	(Northwest Africa)	P 2012	950	L6-melt breccia
Northwest Africa 7850	NWA 7850	(Northwest Africa)	P 2012	625	H5
Northwest Africa 7851	NWA 7851	(Northwest Africa)	P 2012	585	H4
Northwest Africa 7852	NWA 7852	(Northwest Africa)	P 2012	39	H5
Northwest Africa 7853	NWA 7853	(Northwest Africa)	P 2009	1100	Pallasite
Northwest Africa 7854	NWA 7854	(Northwest Africa)	P 2013	2640	Eucrite-pmict
Northwest Africa 7855	NWA 7855	(Northwest Africa)	P 2013	916	H4
Northwest Africa 7856	NWA 7856	(Northwest Africa)	P 2013	517	LL6
Northwest Africa 7857	NWA 7857	(Northwest Africa)	P 2013	246	LL6
Northwest Africa 7858	NWA 7858	(Northwest Africa)	P 2013	459	H4
Northwest Africa 7859	NWA 7859	(Northwest Africa)	P 2013	853	L3
Northwest Africa 7860	NWA 7860	(Northwest Africa)	P 2012	500	H6
Northwest Africa 7861	NWA 7861	(Northwest Africa)	P 2013	611	L5
Northwest Africa 7862	NWA 7862	(Northwest Africa)	P 2013	317	L4/5
Northwest Africa 7863	NWA 7863	(Northwest Africa)	P 2013	1000	LL5
Northwest Africa 7864	NWA 7864	(Northwest Africa)	P 2002	10400	L3
Northwest Africa 7865	NWA 7865	(Northwest Africa)	P 2012	1480	CV3
Northwest Africa 7866	NWA 7866	(Northwest Africa)	P 2009	11750	L5
Northwest Africa 7867	NWA 7867	Morocco	P 2012	3386	LL7
Northwest Africa 7869	NWA 7869	(Northwest Africa)	P Feb 2004	97.9	L3
Northwest Africa 7870	NWA 7870	(Northwest Africa)	P Feb 2004	42	L4
Northwest Africa 7871	NWA 7871	(Northwest Africa)	P Feb 2004	450	L6
Northwest Africa 7872	NWA 7872	(Northwest Africa)	P Sept 2004	22.5	L3
Northwest Africa 7873	NWA 7873	(Northwest Africa)	P Sept 2009	446	H5-6
Northwest Africa 7874	NWA 7874	Morocco	P Feb 2013	873	Eucrite
Northwest Africa 7875	NWA 7875	Morocco	P Feb 2013	476	H7
Northwest Africa 7876	NWA 7876	(Northwest Africa)	P 2012 Oct	240	L3.1

Northwest Africa 7877	NWA 7877	(Northwest Africa)	P 2012 Dec	104	Eucrite-pmict
Northwest Africa 7878	NWA 7878	(Northwest Africa)	P 2012 Jun	249	L4
Northwest Africa 7879	NWA 7879	(Northwest Africa)	P 2012 Oct	58	CV3
Northwest Africa 7880	NWA 7880	(Northwest Africa)	P 2012 Oct	199	Ureilite
Northwest Africa 7881	NWA 7881	(Northwest Africa)	P 2012 Oct	357	Eucrite
Northwest Africa 7882	NWA 7882	(Northwest Africa)	P 2013 Feb	35	Ureilite
Northwest Africa 7883	NWA 7883	(Northwest Africa)	P 2013 Feb	25	CO3
Northwest Africa 7884	NWA 7884	(Northwest Africa)	P 2013 Feb	45	CK6
Northwest Africa 7885	NWA 7885	(Northwest Africa)	P 2013 Feb	83	L6
Northwest Africa 7886	NWA 7886	(Northwest Africa)	P 2013 Feb	252	L6
Northwest Africa 7887	NWA 7887	(Northwest Africa)	P 2013 Feb	13	CV3
Northwest Africa 7888	NWA 7888	(Northwest Africa)	P 2013 Feb	494	LL7
Northwest Africa 7889	NWA 7889	(Northwest Africa)	P 2013 Feb	28	Eucrite
Northwest Africa 7891	NWA 7891	Morocco	P 2012	168	CV3-an
Northwest Africa 7892	NWA 7892	Morocco	P 2012	346	CO3.0
Northwest Africa 7893	NWA 7893	Morocco	2012	~400	R5
Northwest Africa 7894	NWA 7894	(Northwest Africa)	P Jan 2011	36.6	Diogenite
Northwest Africa 7895	NWA 7895	Morocco	P 2012	136	L6
Northwest Africa 7896	NWA 7896	Morocco	P 2012 Aug 19	106	Diogenite
Northwest Africa 7897	NWA 7897	Morocco	P 2012 Aug 19	66.7	LL6
Northwest Africa 7898	NWA 7898	Morocco	P Dec 2012	180	CK5
Northwest Africa 7899	NWA 7899	Morocco	P 2011	420.2	L6
Northwest Africa 7900	NWA 7900	Morocco	P 2013	899.4	LL6
Northwest Africa 7901	NWA 7901	Morocco	P 2013	1962.4	H6
Northwest Africa 7902	NWA 7902	Morocco	P 2013	2016.5	L3.7
Northwest Africa 7903	NWA 7903	Morocco	P 2013	90	Eucrite-mmict
Northwest Africa 7904	NWA 7904	Morocco	P 2012	6334	Brachinite
Northwest Africa 7905	NWA 7905	Morocco	P 2004	1014.1	L5
Northwest Africa 7906	NWA 7906	(Northwest Africa)	P Jan 2013	47.68	Martian (basaltic breccia)
Northwest Africa 7907	NWA 7907	(Northwest Africa)	P Jan 2013	29.94	Martian (basaltic breccia)
Northwest Africa 7908	NWA 7908	(Northwest Africa)	P Feb 2004	157	Diogenite
Northwest Africa 7909	NWA 7909	(Northwest Africa)	P 2004	168	Mesosiderite-C2
Northwest Africa 7910	NWA 7910	(Northwest Africa)	P Sept 2009	499	Mesosiderite-B2
Northwest Africa 7912	NWA 7912	Morocco	P 2013	56	Diogenite
Northwest Africa 7913	NWA 7913	Morocco	P 2013	95	Eucrite-cm
Northwest Africa 7914	NWA 7914	Morocco	P 2013	268	Eucrite-mmict
Northwest Africa 7915	NWA 7915	Morocco	P 2010	415	LL5
Northwest Africa 7916	NWA 7916	(Northwest Africa)	P Nov 2010	897	CO3
Northwest Africa 7917	NWA 7917	Morocco	P 2012	150.11	H3.4
Northwest Africa 7918	NWA 7918	Morocco	P 2012	102.19	R3
Northwest Africa 7919	NWA 7919	Morocco	P 2012	43.77	Diogenite
Northwest Africa 7920	NWA 7920	Morocco	P 2012	4505	Pallasite, PMG
Northwest Africa 7921	NWA 7921	Morocco	P 2012	704.19	CV3

Northwest Africa 7922	NWA 7922	Morocco	P 2012	105.34	H6
Northwest Africa 7923	NWA 7923	Morocco	P 2012	73.82	LL6
Northwest Africa 7924	NWA 7924	Morocco	P 2012	510.81	H6
Northwest Africa 7925	NWA 7925	Morocco	P 2012	130.1	H4
Northwest Africa 7926	NWA 7926	Morocco	P 2012	500.18	LL6
Northwest Africa 7927	NWA 7927	Morocco	P 2012	658.18	LL6
Northwest Africa 7928	NWA 7928	Morocco	P 2012	106.97	L5
Northwest Africa 7929	NWA 7929	(Northwest Africa)	P 2013	26	CV3
Northwest Africa 7930	NWA 7930	(Northwest Africa)	P 2013	22	CV3
Northwest Africa 7931	NWA 7931	(Northwest Africa)	P 2013 May	5.92	Lunar (feldsp. breccia)
Northwest Africa 7932	NWA 7932	Morocco	P 2013	160	CV3
Northwest Africa 7934	NWA 7934	(Northwest Africa)	P 2013 April	22.7	LL5
Northwest Africa 7935	NWA 7935	(Northwest Africa)	P 2013 April	48.2	LL5
Northwest Africa 7936	NWA 7936	(Northwest Africa)	P 2012	1300	L3
Northwest Africa 7937	NWA 7937	(Northwest Africa)	P 2013	152.9	Martian (shergottite)
Northwest Africa 7938	NWA 7938	(Northwest Africa)	P 2013 Feb	56	H3
Northwest Africa 7939	NWA 7939	(Northwest Africa)	P 2013 Feb	146.6	LL4-6
Northwest Africa 7940	NWA 7940	(Northwest Africa)	P 2013 Feb	184	L3
Northwest Africa 7941	NWA 7941	(Northwest Africa)	P 2013 Feb	280	L3
Northwest Africa 7942	NWA 7942	(Northwest Africa)	P 2012 Sep	608	CV3
Northwest Africa 7943	NWA 7943	(Northwest Africa)	P 2012 Feb	593	Eucrite-pmict
Northwest Africa 7944	NWA 7944	(Northwest Africa)	P 2013 Apr	815	Martian (shergottite)
Northwest Africa 7945	NWA 7945	(Northwest Africa)	P 2013 Mar	1800	Lodranite
Northwest Africa 7946	NWA 7946	(Northwest Africa)	P 2013 May	771	CO3
Northwest Africa 7947	NWA 7947	(Northwest Africa)	P 2013 May	392	Diogenite
Northwest Africa 7948	NWA 7948	(Northwest Africa)	P 2013 Apr	59.8	Lunar (feldsp. breccia)
Northwest Africa 7950	NWA 7950	(Northwest Africa)	P 2013 May	590	Diogenite
Northwest Africa 7951	NWA 7951	(Northwest Africa)	P 2013 Apr	1369	H6
Northwest Africa 7952	NWA 7952	(Northwest Africa)	P 2013 May	110	Diogenite-pm
Northwest Africa 7953	NWA 7953	(Northwest Africa)	P 2013 Jun	50.8	CK4
Northwest Africa 7954	NWA 7954	(Northwest Africa)	P 2013 Apr	109.6	Eucrite-mmict
Northwest Africa 7955	NWA 7955	(Northwest Africa)	P 2013 Apr	95.1	Diogenite-pm
Northwest Africa 7956	NWA 7956	(Northwest Africa)	P 2013 Apr	55.2	LL6
Northwest Africa 7957	NWA 7957	(Northwest Africa)	P 2013 Apr	86.1	CO3
Northwest Africa 7958	NWA 7958	(Northwest Africa)	P 2013 Apr	48.3	Eucrite
Northwest Africa 7959	NWA 7959	(Northwest Africa)	P 2013 Jun	156	Lunar (feldsp. breccia)
Northwest Africa 7960	NWA 7960	Morocco	P 2013	308.5	Eucrite-unbr
Northwest Africa 7961	NWA 7961	Morocco	P 2013	252	LL5
Northwest Africa 7962	NWA 7962	(Northwest Africa)	Jan 2011	110.3	H5
Northwest Africa 7963	NWA 7963	(Northwest Africa)	P 2013	457.7	LL5
Northwest Africa 7964	NWA 7964	(Northwest Africa)	P 2013	350.4	H5
Northwest Africa 7965	NWA 7965	(Northwest Africa)	P 2009	165	LL5-6
Northwest Africa 7971	NWA 7971	Morocco	P 2012	52.6	Eucrite-mmict
Northwest Africa 7972	NWA 7972	Morocco	P 2013	1112.7	L5

Northwest Africa 7973	NWA 7973	Morocco	P 2013	199.9	H6
Northwest Africa 7974	NWA 7974	Morocco	P 2013	662.2	LL6
Northwest Africa 7975	NWA 7975	Morocco	P 2013	622.4	L6
Northwest Africa 7976	NWA 7976	Morocco	P 2013	1311.7	EH6
Northwest Africa 7977	NWA 7977	Morocco	P 2013	3403	Diogenite
Northwest Africa 7978	NWA 7978	Morocco	P 2013	680.7	L3.10
Northwest Africa 7979	NWA 7979	Morocco	P 2013	131.8	R5
Northwest Africa 7980	NWA 7980	Morocco	P 2013	386.2	L3.10
Northwest Africa 7981	NWA 7981	Morocco	P 2013	110.9	LL3.5
Northwest Africa 7982	NWA 7982	Morocco	P 2013	614.9	Eucrite
Northwest Africa 7983	NWA 7983	Morocco	P 2013	424.3	Ureilite
Northwest Africa 7986	NWA 7986	(Northwest Africa)	P 2013 Jun	12.2	Lunar (feldsp. breccia)
Northwest Africa 7987	NWA 7987	(Northwest Africa)	P 2013 Apr	1377	H4
Northwest Africa 7990	NWA 7990	(Northwest Africa)	P 2010	452	LL7
Northwest Africa 7991	NWA 7991	(Northwest Africa)	P 2010	48	Diogenite
Northwest Africa 7992	NWA 7992	(Northwest Africa)	P 2010	205	H6
Northwest Africa 7993	NWA 7993	(Northwest Africa)	P 2010	575	L6
Northwest Africa 7994	NWA 7994	(Northwest Africa)	P 2010	95	Diogenite
Northwest Africa 7995	NWA 7995	(Northwest Africa)	P 2011	351	H7
Northwest Africa 7996	NWA 7996	(Northwest Africa)	P 2011	675	H4
Northwest Africa 7997	NWA 7997	(Northwest Africa)	P 2011	60	Diogenite
Northwest Africa 7998	NWA 7998	(Northwest Africa)	P 2013 May	59000	L5
Northwest Africa 7999	NWA 7999	(Northwest Africa)	P 2013 Jul	500	Eucrite-pmict
Northwest Africa 8000	NWA 8000	(Northwest Africa)	P 2013 Jun	23	Diogenite
Northwest Africa 8001	NWA 8001	(Northwest Africa)	P 2013 Jun	23.4	Lunar (feldsp. breccia)
Northwest Africa 8002	NWA 8002	(Northwest Africa)	P 2013 Jun	89	L3
Northwest Africa 8003	NWA 8003	(Northwest Africa)	P 2013 Jul	273	Eucrite
Northwest Africa 8004	NWA 8004	(Northwest Africa)	P 2013 April	12.4	CR2
Northwest Africa 8007	NWA 8007	Morocco	P 2013	664	L3.2
Northwest Africa 8008	NWA 8008	(Northwest Africa)	2009	1639	L4
Northwest Africa 8009	NWA 8009	(Northwest Africa)	P 2013 July	7500	Eucrite
Northwest Africa 8010	NWA 8010	Morocco	2013	58	Lunar (feldsp. breccia)
Northwest Africa 8012	NWA 8012	(Northwest Africa)	P 2013 Jul	1881	R6
Northwest Africa 8013	NWA 8013	(Northwest Africa)	P 2013 Aug	77	LL6
Northwest Africa 8014	NWA 8014	(Northwest Africa)	P 2013 May	210	Achondrite-ung
Northwest Africa 8016	NWA 8016	(Northwest Africa)	P 2011 Jan	18.8	LL6
Northwest Africa 8017	NWA 8017	(Northwest Africa)	P 2011 Aug	816	LL6
Northwest Africa 8018	NWA 8018	(Northwest Africa)	P 2011 Aug	392	H4
Northwest Africa 8019	NWA 8019	(Northwest Africa)	P 2013 Aug	3652	H4
Northwest Africa 8020	NWA 8020	(Northwest Africa)	P 2013 Aug	81	Eucrite
Northwest Africa 8021	NWA 8021	(Northwest Africa)	P 2013 Jul	185.6	Eucrite
Northwest Africa 8022	NWA 8022	(Northwest Africa)	P 2013 May	1226	Lunar (feldsp. breccia)
Northwest Africa 8023	NWA 8023	(Northwest Africa)	P 2013	178.8	L6
Northwest Africa 8024	NWA 8024	(Northwest Africa)	P Autumn 2003	4737	L4

Northwest Africa 8025	NWA 8025	(Northwest Africa)	P Autumn 2003	15441	L5
Northwest Africa 8028	NWA 8028	(Northwest Africa)	P Autumn 2003	4149	L6
Northwest Africa 8029	NWA 8029	(Northwest Africa)	P Autumn 2003	288	L6
Northwest Africa 8031	NWA 8031	(Northwest Africa)	P 2012	380	L3.9
Northwest Africa 8032	NWA 8032	(Northwest Africa)	P 2012	3240	L6
Northwest Africa 8034	NWA 8034	(Northwest Africa)	P 2012	1517	L5
Northwest Africa 8035	NWA 8035	(Northwest Africa)	P 2012	35	L6
Northwest Africa 8037	NWA 8037	(Northwest Africa)	P 2013 Feb	1460	H3
Northwest Africa 8038	NWA 8038	(Northwest Africa)	P 2013 Feb	652	CO3
Northwest Africa 8039	NWA 8039	(Northwest Africa)	P 2013	99	H3
Northwest Africa 8040	NWA 8040	(Northwest Africa)	P 2013	118	CK4
Northwest Africa 8042	NWA 8042	(Northwest Africa)	P 2013	131.8	H5
Northwest Africa 8043	NWA 8043	Morocco	P 2013	1860	Diogenite
Northwest Africa 8044	NWA 8044	Morocco	P 2011	715	Howardite
Northwest Africa 8045	NWA 8045	Morocco	P 2013	5504	L5
Northwest Africa 8051	NWA 8051	(Northwest Africa)	P 2012 Oct	165	L5
Northwest Africa 8054	NWA 8054	(Northwest Africa)	P 2013 Sep	118	Achondrite-ung
Northwest Africa 8061	NWA 8061	Morocco	P 2013	876.22	H3.10
Northwest Africa 8062	NWA 8062	Morocco	P 2013	202.19	LL6
Northwest Africa 8063	NWA 8063	Morocco	P 2013	572.92	H4
Northwest Africa 8064	NWA 8064	Morocco	P 2013	2972.04	H6
Northwest Africa 8065	NWA 8065	Morocco	P 2013	11150	L6
Northwest Africa 8066	NWA 8066	Morocco	P 2013	4040.71	H5
Northwest Africa 8067	NWA 8067	Morocco	P 2013	4202.82	H4
Northwest Africa 8068	NWA 8068	(Northwest Africa)	P 2012 Jun 30	911	L6
Northwest Africa 8070	NWA 8070	(Northwest Africa)	P 2012 Jun 30	480	H4
Northwest Africa 8071	NWA 8071	(Northwest Africa)	P 2012 Jun 30	640	L6
Northwest Africa 8072	NWA 8072	(Northwest Africa)	P 2012 Jun 30	199	L5
Northwest Africa 8074	NWA 8074	(Northwest Africa)	P 2012 Jun 30	295	H5
Northwest Africa 8079	NWA 8079	(Northwest Africa)	P 2012 Jun 30	76	H5
Northwest Africa 8080	NWA 8080	(Northwest Africa)	P 2012 Jun 30	44	H5
Northwest Africa 8082	NWA 8082	(Northwest Africa)	P 2012 Jun 30	41	LL6
Northwest Africa 8083	NWA 8083	(Northwest Africa)	P 2012 Jun 30	23	LL6
Northwest Africa 8084	NWA 8084	(Northwest Africa)	P 2012 Jun 30	27	H5
Northwest Africa 8088	NWA 8088	(Northwest Africa)	P 2013 July	7320	L5
Northwest Africa 8097	NWA 8097	(Northwest Africa)	P 2013	250	L5
Northwest Africa 8098	NWA 8098	(Northwest Africa)	P 2013	211	H5
Northwest Africa 8100	NWA 8100	(Northwest Africa)	P 2013	240	L5
Northwest Africa 8101	NWA 8101	(Northwest Africa)	P 2013	695	H5
Northwest Africa 8102	NWA 8102	(Northwest Africa)	P 2013	435	L5
Northwest Africa 8103	NWA 8103	(Northwest Africa)	P 2013	160	L6
Northwest Africa 8105	NWA 8105	(Northwest Africa)	P 2013	115	H5
Northwest Africa 8106	NWA 8106	(Northwest Africa)	P 2013	43	LL6
Northwest Africa 8112	NWA 8112	(Northwest Africa)	P 2013	1200	L5

Northwest Africa 8113	NWA 8113	(Northwest Africa)	P 2013	895	L5
Northwest Africa 8114	NWA 8114	Western Sahara	Feb 2013	1.9	Martian (basaltic breccia)
Northwest Africa 8115	NWA 8115	(Northwest Africa)	P 2006 Mar	237	Diogenite
Northwest Africa 8116	NWA 8116	(Northwest Africa)	P 2007	0.48	Martian (shergottite)
Northwest Africa 8117	NWA 8117	(Northwest Africa)	P 2013 May	2.41	Eucrite
Northwest Africa 8125	NWA 8125	(Northwest Africa)	P 2013 Apr	156	H5
Northwest Africa 8139	NWA 8139	Morocco	P July 2013	178	H4
Northwest Africa 8140	NWA 8140	(Northwest Africa)	P 2013	92.45	L5
Northwest Africa 8141	NWA 8141	(Northwest Africa)	P May 24, 2002	45	L3-6
Northwest Africa 8142	NWA 8142	(Northwest Africa)	P 2010	12	L5-melt breccia
Northwest Africa 8143	NWA 8143	Morocco	P July 2013	310	LL3
Northwest Africa 8144	NWA 8144	Morocco	P 1993 summer	148.89	L4
Northwest Africa 8145	NWA 8145	Morocco	P 1993 summer	162.15	L5
Northwest Africa 8146	NWA 8146	Morocco	P 1993 summer	111.32	L6
Northwest Africa 8147	NWA 8147	Morocco	P 1993 summer	52.11	H4
Northwest Africa 8148	NWA 8148	Morocco	P 1993 summer	196.19	H4
Northwest Africa 8149	NWA 8149	Morocco	P 1993 summer	611.23	L6
Northwest Africa 8150	NWA 8150	Morocco	P 1993 summer	126.67	L6
Northwest Africa 8151	NWA 8151	Morocco	P 1993 summer	837.63	H4
Northwest Africa 8152	NWA 8152	Morocco	P 1993 summer	1331.13	L6
Northwest Africa 8153	NWA 8153	Morocco	P 1993 summer	890.59	L6
Northwest Africa 8154	NWA 8154	(Northwest Africa)	P 2005	5300	Iron, ungrouped
Northwest Africa 8155	NWA 8155	(Northwest Africa)	P 2011	208	Iron, ungrouped
Northwest Africa 8156	NWA 8156	(Northwest Africa)	P 2011	6500	Iron, IVA
Northwest Africa 8157	NWA 8157	(Northwest Africa)	P Sept 2011	82	CM2
Northwest Africa 8158	NWA 8158	(Northwest Africa)	P May 2011	70	Eucrite
Northwest Africa 8159	NWA 8159	Morocco	P 2013	149.39	Martian (augite basalt)
Northwest Africa 8160	NWA 8160	Morocco	P 2013	5300	CV3
Northwest Africa 8161	NWA 8161	Morocco	P 2013	216	Martian (shergottite)
Northwest Africa 8162	NWA 8162	Morocco	P 2013	297.4	Eucrite-mmict
Northwest Africa 8163	NWA 8163	(Northwest Africa)	P 2006	35.7	H4
Northwest Africa 8164	NWA 8164	(Northwest Africa)	P Oct 2013	62.0	CK6
Nothing		United States	2010	3700	Iron, IID
Nova 012		Egypt	P 2010	266	H5
O'Malley 020		Australia	14 Apr 2010	13	H4
Ouadangou		Burkina Faso	November 2003	4440	L5
Paposo 004		Chile	2011 Jun 24	8250	L3.1
Paposo 005		Chile	2011 Jun 24	1802	H5
Paposo 006		Chile	2011 Jun 23	297	H3
Paposo 007		Chile	2011 Jun 24	951	H3-5
Paposo 008		Chile	2011 Jun 23	1035	H5
Paposo 009		Chile	2011 Jun 24	120	H5

Paposo 010		Chile	2011 Jul 2	1569	H6
Paposo 011		Chile	2011 Jun 23	418	L6
Paposo 012		Chile	2011 Jun 24	670	H6
Paposo 013		Chile	2011 Jul 2	1569	H6
Paposo 014		Chile	2009 Dec 12	7872	L6
Paposo 015		Chile	2011 Jun 24	135	H6
Paposo 016		Chile	2011 Jun 24	25	H5
Patuxent Range 10200	PAT 10200	Antarctica	2010	5908.4	LL5
Patuxent Range 10201	PAT 10201	Antarctica	2010	1674.1	LL5
Patuxent Range 10202	PAT 10202	Antarctica	2010	343.4	LL5
Patuxent Range 10204	PAT 10204	Antarctica	2010	103.6	LL5
Patuxent Range 10205	PAT 10205	Antarctica	2010	15.9	L5
Patuxent Range 10206	PAT 10206	Antarctica	2010	19.7	L5
Patuxent Range 10207	PAT 10207	Antarctica	2010	6.3	L6
Patuxent Range 10208	PAT 10208	Antarctica	2010	13.4	L5
Patuxent Range 10209	PAT 10209	Antarctica	2010	8.3	LL5
Patuxent Range 10210	PAT 10210	Antarctica	2010	5.6	LL6
Patuxent Range 10211	PAT 10211	Antarctica	2010	6.8	H5
Patuxent Range 10212	PAT 10212	Antarctica	2010	2.4	H6
Patuxent Range 10213	PAT 10213	Antarctica	2010	5.1	H6
Patuxent Range 10214	PAT 10214	Antarctica	2010	14.3	H6
Patuxent Range 10215	PAT 10215	Antarctica	2010	9.1	L6
Patuxent Range 10216	PAT 10216	Antarctica	2010	13.6	LL6
Patuxent Range 10217	PAT 10217	Antarctica	2010	9.0	L6
Patuxent Range 10218	PAT 10218	Antarctica	2010	5.6	L6
Patuxent Range 10219	PAT 10219	Antarctica	2010	2.5	LL6
Patuxent Range 10220	PAT 10220	Antarctica	2010	1.8	L5
Patuxent Range 10221	PAT 10221	Antarctica	2010	2.7	L6
Patuxent Range 10222	PAT 10222	Antarctica	2010	3.9	L6
Patuxent Range 10223	PAT 10223	Antarctica	2010	2.9	L5
Patuxent Range 10224	PAT 10224	Antarctica	2010	2.7	L5
Patuxent Range 10225	PAT 10225	Antarctica	2010	4.3	H6
Patuxent Range 10226	PAT 10226	Antarctica	2010	5.6	L5
Patuxent Range 10227	PAT 10227	Antarctica	2010	2.2	H6
Patuxent Range 10228	PAT 10228	Antarctica	2010	3.3	LL6
Patuxent Range 10229	PAT 10229	Antarctica	2010	1.6	H6
Patuxent Range 10230	PAT 10230	Antarctica	2010	8.0	L6
Patuxent Range 10231	PAT 10231	Antarctica	2010	9.2	H6
Patuxent Range 10232	PAT 10232	Antarctica	2010	18.4	H6
Patuxent Range 10233	PAT 10233	Antarctica	2010	7.4	L6
Patuxent Range 10234	PAT 10234	Antarctica	2010	14.4	L6
Patuxent Range 10235	PAT 10235	Antarctica	2010	5.9	L5
Patuxent Range 10236	PAT 10236	Antarctica	2010	6.1	L6
Patuxent Range 10237	PAT 10237	Antarctica	2010	3.8	H6

Patuxent Range 10238	PAT 10238	Antarctica	2010	3.2	H6
Patuxent Range 10239	PAT 10239	Antarctica	2010	3.1	H5
Patuxent Range 10240	PAT 10240	Antarctica	2010	11.4	L6
Patuxent Range 10241	PAT 10241	Antarctica	2010	4.0	H6
Patuxent Range 10242	PAT 10242	Antarctica	2010	4.4	H5
Patuxent Range 10243	PAT 10243	Antarctica	2010	4.0	H6
Patuxent Range 10244	PAT 10244	Antarctica	2010	2.4	LL6
Patuxent Range 10245	PAT 10245	Antarctica	2010	2.0	L6
Patuxent Range 10246	PAT 10246	Antarctica	2010	1.1	LL6
Patuxent Range 10247	PAT 10247	Antarctica	2010	1.8	H6
Patuxent Range 10248	PAT 10248	Antarctica	2010	2.4	L6
Patuxent Range 10249	PAT 10249	Antarctica	2010	2.7	H6
Patuxent Range 10250	PAT 10250	Antarctica	2010	2.4	L6
Patuxent Range 10251	PAT 10251	Antarctica	2010	1.4	L6
Patuxent Range 10252	PAT 10252	Antarctica	2010	7.2	L6
Patuxent Range 10253	PAT 10253	Antarctica	2010	8.4	L6
Patuxent Range 10254	PAT 10254	Antarctica	2010	2.7	L5
Patuxent Range 10255	PAT 10255	Antarctica	2010	2.8	L6
Patuxent Range 10256	PAT 10256	Antarctica	2010	1.8	H6
Patuxent Range 10257	PAT 10257	Antarctica	2010	19.8	L6
Patuxent Range 10258	PAT 10258	Antarctica	2010	2.0	L5
Patuxent Range 10259	PAT 10259	Antarctica	2010	6.3	H6
Patuxent Range 10260	PAT 10260	Antarctica	2010	2.8	L6
Patuxent Range 10261	PAT 10261	Antarctica	2010	1.6	H6
Patuxent Range 10262	PAT 10262	Antarctica	2010	1.6	L5
Patuxent Range 10263	PAT 10263	Antarctica	2010	8.5	L6
Patuxent Range 10264	PAT 10264	Antarctica	2010	1.2	L5
Patuxent Range 10265	PAT 10265	Antarctica	2010	6.2	H6
Patuxent Range 10266	PAT 10266	Antarctica	2010	3.3	H6
Patuxent Range 10267	PAT 10267	Antarctica	2010	1.3	L5
Patuxent Range 10268	PAT 10268	Antarctica	2010	3.5	L6
Patuxent Range 10269	PAT 10269	Antarctica	2010	1.8	L6
Patuxent Range 10270	PAT 10270	Antarctica	2010	4.1	L5
Patuxent Range 10271	PAT 10271	Antarctica	2010	2.0	L5
Patuxent Range 10272	PAT 10272	Antarctica	2010	4.0	H6
Patuxent Range 10273	PAT 10273	Antarctica	2010	2.9	H6
Patuxent Range 10274	PAT 10274	Antarctica	2010	2.4	H6
Patuxent Range 10275	PAT 10275	Antarctica	2010	4.5	L6
Patuxent Range 10276	PAT 10276	Antarctica	2010	3.0	L6
Patuxent Range 10277	PAT 10277	Antarctica	2010	1.1	H6
Patuxent Range 10278	PAT 10278	Antarctica	2010	2.0	H6
Patuxent Range 10279	PAT 10279	Antarctica	2010	2.8	L6
Patuxent Range 10280	PAT 10280	Antarctica	2010	2.0	L6
Patuxent Range 10281	PAT 10281	Antarctica	2010	3.8	H6

Patuxent Range 10282	PAT 10282	Antarctica	2010	4.0	L6
Patuxent Range 10283	PAT 10283	Antarctica	2010	5.1	H5
Patuxent Range 10284	PAT 10284	Antarctica	2010	2.5	H6
Patuxent Range 10285	PAT 10285	Antarctica	2010	3.1	L6
Patuxent Range 10286	PAT 10286	Antarctica	2010	6.0	H5
Patuxent Range 10287	PAT 10287	Antarctica	2010	1.8	H6
Patuxent Range 10288	PAT 10288	Antarctica	2010	10.6	H5
Patuxent Range 10289	PAT 10289	Antarctica	2010	11.6	H6
Patuxent Range 10290	PAT 10290	Antarctica	2010	4.3	L6
Patuxent Range 10291	PAT 10291	Antarctica	2010	2.1	L6
Patuxent Range 10292	PAT 10292	Antarctica	2010	15.7	L6
Patuxent Range 10293	PAT 10293	Antarctica	2010	2.1	L6
Patuxent Range 10294	PAT 10294	Antarctica	2010	2.4	L6
Patuxent Range 10295	PAT 10295	Antarctica	2010	4.1	L6
Patuxent Range 10296	PAT 10296	Antarctica	2010	2.7	L5
Patuxent Range 10297	PAT 10297	Antarctica	2010	4.1	H6
Patuxent Range 10298	PAT 10298	Antarctica	2010	1.5	L6
Patuxent Range 10299	PAT 10299	Antarctica	2010	5.2	H5
Patuxent Range 10300	PAT 10300	Antarctica	2010	2.5	L6
Patuxent Range 10301	PAT 10301	Antarctica	2010	2.4	H5
Patuxent Range 10302	PAT 10302	Antarctica	2010	1.7	H6
Patuxent Range 10303	PAT 10303	Antarctica	2010	2.4	H6
Patuxent Range 10304	PAT 10304	Antarctica	2010	1.6	H6
Patuxent Range 10305	PAT 10305	Antarctica	2010	1.4	L6
Patuxent Range 10306	PAT 10306	Antarctica	2010	3.0	H6
Patuxent Range 10307	PAT 10307	Antarctica	2010	1.3	L6
Patuxent Range 10308	PAT 10308	Antarctica	2010	1.1	L5
Patuxent Range 10309	PAT 10309	Antarctica	2010	2.1	H6
Patuxent Range 10310	PAT 10310	Antarctica	2010	16	L6
Patuxent Range 10312	PAT 10312	Antarctica	2010	9.3	LL5
Patuxent Range 10313	PAT 10313	Antarctica	2010	9.4	L6
Patuxent Range 10314	PAT 10314	Antarctica	2010	7.3	LL6
Patuxent Range 10315	PAT 10315	Antarctica	2010	6.8	L6
Patuxent Range 10316	PAT 10316	Antarctica	2010	5.5	L6
Patuxent Range 10317	PAT 10317	Antarctica	2010	6.6	H6
Patuxent Range 10318	PAT 10318	Antarctica	2010	4.8	L5
Patuxent Range 10319	PAT 10319	Antarctica	2010	5.5	L6
Patuxent Range 10320	PAT 10320	Antarctica	2010	1.1	L5
Patuxent Range 10321	PAT 10321	Antarctica	2010	1.4	L6
Patuxent Range 10322	PAT 10322	Antarctica	2010	2.5	L6
Patuxent Range 10323	PAT 10323	Antarctica	2010	4.2	H6
Patuxent Range 10324	PAT 10324	Antarctica	2010	3.3	L6
Patuxent Range 10325	PAT 10325	Antarctica	2010	1.4	L6
Qatar 001		Qatar	10 May 2010	6700	H5

Ramlat as Sahmah 318	RaS 318	Oman	18 Feb 2009	1172.4	L5
Ramlat as Sahmah 429	RaS 429	Oman	2011 Jan 22	17.35	LL3-6
Ramlat as Sahmah 431	RaS 431	Oman	2010 Oct 6	3000	L6
Ramlat as Sahmah 432	RaS 432	Oman	Jan 2013	3138	L5
Ramlat as Sahmah 433	RaS 433	Oman	Jan 2013	480	L4
Ramlat as Sahmah 434	RaS 434	Oman	Jan 2013	1150	H6
Ramlat as Sahmah 435	RaS 435	Oman	Jan 2013	1400	L4
Ramlat as Sahmah 436	RaS 436	Oman	Jan 2013	1590	H5
Ramlat as Sahmah 437	RaS 437	Oman	Jan 2013	2000	L6
Ramlat as Sahmah 438	RaS 438	Oman	Jan 2013	245	H5
Ramlat as Sahmah 439	RaS 439	Oman	Jan 2013	9050	L4
Ramlat as Sahmah 440	RaS 440	Oman	Jan 2013	3700	L5
Ramlat as Sahmah 441	RaS 441	Oman	Jan 2013	740	H3
Ramlat as Sahmah 442	RaS 442	Oman	Jan 2013	1650	L6
Ramlat as Sahmah 443	RaS 443	Oman	Jan 2013	325	H5
Ramlat as Sahmah 444	RaS 444	Oman	Jan 2013	507	L6
Ramlat as Sahmah 445	RaS 445	Oman	Jan 2013	3080	L3
Ramlat as Sahmah 446	RaS 446	Oman	Jan 2013	1000	H6
Ramlat as Sahmah 447	RaS 447	Oman	2013	4444	L4
Retuerta del Bullaque		Spain	1980	~100000	Iron, IAB-MG
Rosamond		United States	2012 June 9	11.10	LL3
Sahara 97010		(Sahara)	1997 Feb	305	H5-6
Sahara 97022		(Sahara)	1997 Feb	410	H5
Sahara 97031		(Sahara)	1997 Feb	549	H4-5
Sahara 97041		(Sahara)	1997 Apr	385	H5/6
Sahara 97043		(Sahara)	1997 Apr	189	L5
Sahara 97046		(Sahara)	1997 Apr	656	L5
Sahara 97056		(Sahara)	1997 Apr	5800	H5
Sahara 98020		(Sahara)	1998 Sept	192	H6
Sahara 98342		(Sahara)	1998	57	L6
Sahara 98343		(Sahara)	1998	85	L6
Sahara 98399		(Sahara)	1998	219	L5
Sahara 98402		(Sahara)	1998	405	H4/5
Sahara 98447		(Sahara)	1998	2468	L6
Sahara 98460		(Sahara)	1998	165	H4
Sahara 98462		(Sahara)	1998	236	H4-6
Sahara 98463		(Sahara)	1998	142	H4/5
Sahara 98464		(Sahara)	1998	61	L6
Sahara 98478		(Sahara)	1998	212	L5
Sahara 98483		(Sahara)	1998	150	H4
Sahara 98497		(Sahara)	1998	2856	L6
Sahara 98541		(Sahara)	1998	432	H5
Sahara 98542		(Sahara)	1998	1965	L6
Sahara 98545		(Sahara)	1998	578	L3

Sahara 98553	(Sahara)	1998	403	H4
Sahara 99062	(Sahara)	1999	21	H5
Sahara 99586	(Sahara)	1999	730	H6
Sahara 99597	(Sahara)	1999	333	L5/6
Sahara 99598	(Sahara)	1999	590	H5
Sahara 99599	(Sahara)	1999	565	L5
Sahara 99600	(Sahara)	1999	2398	H5-6
Sahara 99601	(Sahara)	1999	184	L6
Sahara 99602	(Sahara)	1999	943	H5
Sahara 99604	(Sahara)	1999	1233	L5/6
Sahara 99605	(Sahara)	1999	733	H5
Sahara 99606	(Sahara)	1999	1388	H5
Sahara 99607	(Sahara)	1999	796	H5
Sahara 99608	(Sahara)	1999	1313	L6
Sahara 99609	(Sahara)	1999	734	H4/5
Sahara 99611	(Sahara)	1999	253	L6
Sahara 99612	(Sahara)	1999	1080	H4/5
Sahara 99613	(Sahara)	1999	343	L6
Sahara 99614	(Sahara)	1999	347	H5
Sahara 99615	(Sahara)	1999	295	L5
Sahara 99616	(Sahara)	1999	127	H5
Sahara 99617	(Sahara)	1999	915	H4/5
Sahara 99618	(Sahara)	1999	595	H5
Sahara 99619	(Sahara)	1999	729	L6
Sahara 99621	(Sahara)	1999	497	H5
Sahara 99622	(Sahara)	1999	323	L5-6
Sahara 99623	(Sahara)	1999	218	H6
Sahara 99624	(Sahara)	1999	655	L5
Sahara 99625	(Sahara)	1999	318	H5
Sahara 99626	(Sahara)	1999	1110	H5
Sahara 99627	(Sahara)	1999	660	H5
Sahara 99628	(Sahara)	1999	166	H5
Sahara 99629	(Sahara)	1999	156	H5-6
Sahara 99630	(Sahara)	1999	356	L6
Sahara 99631	(Sahara)	1999	416	H5-6
Sahara 99633	(Sahara)	1999	363	H4-5
Sahara 99634	(Sahara)	1999	879	H5/6
Sahara 99635	(Sahara)	1999	345	H5-6
Sahara 99636	(Sahara)	1999	877	H4
Sahara 99698	(Sahara)	1999	1137	L6
Sahara 99700	(Sahara)	1999	1604	L5
Sahara 99703	(Sahara)	1999	226	H5
Sahara 99704	(Sahara)	1999	2580	H5
Sahara 99705	(Sahara)	1999	1750	H5/6

Sahara 99706	(Sahara)	1999	1100	L5
Sahara 99707	(Sahara)	1999	187	L6
Sahara 99708	(Sahara)	1999	279	H6
Sahara 99709	(Sahara)	1999	231	H6
Sahara 99710	(Sahara)	1999	203	L5/6
Sahara 99711	(Sahara)	1999	308	H4/5
Sahara 99712	(Sahara)	1999	1201	H6
Sahara 99713	(Sahara)	1999	446	H5
Sahara 99714	(Sahara)	1999	975	H5
Sahara 99715	(Sahara)	1999	531	H5
Sahara 99716	(Sahara)	1999	599	H5
Sahara 99717	(Sahara)	1999	1288	H5
Sahara 99718	(Sahara)	1999	514	H5
Sahara 99719	(Sahara)	1999	2565	H4
Sahara 99720	(Sahara)	1999	926	H5
Sahara 99721	(Sahara)	1999	406	H5-6
Sahara 99722	(Sahara)	1999	1071	L6
Sahara 99723	(Sahara)	1999	345	H5
Sahara 99724	(Sahara)	1999	916	H4
Sahara 99725	(Sahara)	1999	141	H5-6
Sahara 99726	(Sahara)	1999	358	L6
Sahara 99727	(Sahara)	1999	4565	L6
Sahara 99728	(Sahara)	1999	181	H5
Sahara 99729	(Sahara)	1999	291	L6
Sahara 99730	(Sahara)	1999	241	H5
Sahara 99731	(Sahara)	1999	229	H5
Sahara 99732	(Sahara)	1999	1828	H5/6
Sahara 99733	(Sahara)	1999	332	H5
Sahara 99734	(Sahara)	1999	302	H5/6
Sahara 99735	(Sahara)	1999	2080	H5
Sahara 99736	(Sahara)	1999	860	H4
Sahara 99737	(Sahara)	1999	752	H5
Sahara 99738	(Sahara)	1999	1384	H5-6
Sahara 99739	(Sahara)	1999	799	H5
Sahara 99740	(Sahara)	1999	809	H5
Sahara 99741	(Sahara)	1999	417	H5
Sahara 99742	(Sahara)	1999	141	H5
Sahara 99743	(Sahara)	1999	2290	H5/6
Sahara 99744	(Sahara)	1999	842	H5-6
Sahara 99745	(Sahara)	1999	666	H5
Sahara 99746	(Sahara)	1999	653	H5
Sahara 99747	(Sahara)	1999	654	H5
Sahara 99748	(Sahara)	1999	355	H5/6
Sahara 99749	(Sahara)	1999	599	H3-6

Sahara 99750	(Sahara)	1999	444	H5
Sahara 99751	(Sahara)	1999	356	H3-5
Sahara 99752	(Sahara)	1999	427	H5-6
Sahara 99753	(Sahara)	1999	302	L6
Sahara 99754	(Sahara)	1999	256	H5
Sahara 99755	(Sahara)	1999	184	H5/6
Sahara 99756	(Sahara)	1999	1800	L6
Sahara 99757	(Sahara)	1999	1870	H5
Sahara 99758	(Sahara)	1999	1999	H5
Sahara 99759	(Sahara)	1999	463	H5
Sahara 99760	(Sahara)	1999	409	H5
Sahara 99764	(Sahara)	1999	177	H4
Sahara 99765	(Sahara)	1999	1222	H6
Sahara 99768	(Sahara)	1999	497	H4
Sahara 99769	(Sahara)	1999	903	H5-6
Sahara 99772	(Sahara)	1999	1212	L/LL6
Sahara 99782	(Sahara)	1999	146	L6
Sahara 99783	(Sahara)	1999	110	L5-6
Sahara 99784	(Sahara)	1999	140	L5/6
Sahara 99785	(Sahara)	1999	378	L6
Sahara 99786	(Sahara)	1999	115	L6
Sahara 99787	(Sahara)	1999	410	L6
Sahara 99788	(Sahara)	1999	150	L5/6
Sahara 99789	(Sahara)	1999	230	L6
Sahara 99790	(Sahara)	1999	201	L6
Sahara 99794	(Sahara)	1999	247	H5
Sahara 99801	(Sahara)	1999	562	H5/6
Sahara 99806	(Sahara)	1999	358	H5
Sahara 99807	(Sahara)	1999	680	H5
Sahara 99808	(Sahara)	1999	335	L6
Sahara 99810	(Sahara)	1999	113	H5
Sahara 99811	(Sahara)	1999	395	H5
Sahara 99812	(Sahara)	1999	814	L6
Sahara 99815	(Sahara)	1999	212	H5
Sahara 99817	(Sahara)	1999	220	H5-6
Sahara 99819	(Sahara)	1999	874	H5-6
Sahara 99823	(Sahara)	1999	114	H5
Sahara 99825	(Sahara)	1999	128	H5
Sahara 99826	(Sahara)	1999	684	H5/6
Sahara 99828	(Sahara)	1999	466	H5
Sahara 99832	(Sahara)	1999	596	H5
Sahara 99834	(Sahara)	1999	606	L6
Sahara 99835	(Sahara)	1999	537	H5-6
Sahara 99838	(Sahara)	1999	284	H5/6

Sahara 99839		(Sahara)	1999	3585	H5
Sahara 99850		(Sahara)	1999	1129	H5
Sahara 99856		(Sahara)	1999	331	H4/5
Sahara 99857		(Sahara)	1999	706	H5
Sahara 99863		(Sahara)	1999	167	H5
Sahara 99866		(Sahara)	1999	800	H5
Sahara 99867		(Sahara)	1999	696	H5
Sahara 99868		(Sahara)	1999	366	H5-6
Sahara 99874		(Sahara)	1999	145	H5
Sahara 99881		(Sahara)	1999	473	L6
Sahara 99886		(Sahara)	1999	703	H5
Sahara 99888		(Sahara)	1999	437	L4
Sahara 99891		(Sahara)	1999	349	H5
Sahara 99893		(Sahara)	1999	198	H5
Sahara 99895		(Sahara)	1999	554	H5
Sahara 99896		(Sahara)	1999	128	L6
Sahara 99898		(Sahara)	1999	207	L5
Sahara 99900		(Sahara)	1999	98	H5
Sahara 99903		(Sahara)	1999	264	H5
Sahara 99904		(Sahara)	1999	184	H5
Sahara 99905		(Sahara)	1999	688	L6
Sahara 99908		(Sahara)	1999	409	H6
Sahara 99913		(Sahara)	1999	1152	H4/5
Sahara 99918		(Sahara)	1999	419	H4/5
Sahara 99924		(Sahara)	1999	636	L6
Sahara 99932		(Sahara)	1999	212	H5
Sahara 99933		(Sahara)	1999	319	L5
Sahara 99936		(Sahara)	1999	552	H5
Sahara 99937		(Sahara)	1999	213	H5
San Juan 063	SJ 063	Chile	2010 Dec 23	3384	H5
San Juan 064	SJ 064	Chile	2010 Dec 25	656	L6
San Juan 065	SJ 065	Chile	2010 Dec 23	459	H4
San Juan 066	SJ 066	Chile	2010 Dec 25	441	L6
San Juan 067	SJ 067	Chile	2010 Apr 13	450	H4
San Juan 068	SJ 068	Chile	2010 Apr 17	2580	L6
San Juan 069	SJ 069	Chile	2010 Dec 8	2787	H5
Sayh al Uhaymir 558	SaU 558	Oman	14 Jan 2004	48.5	L5
Sayh al Uhaymir 559	SaU 559	Oman	Nov 2005	107	Ureilite
Sayh al Uhaymir 560	SaU 560	Oman	P 2006	2776	H6
Sayh al Uhaymir 561	SaU 561	Oman	Jan 2011	1074	L6
Sayh al Uhaymir 562	SaU 562	Oman	17 Apr 2008	772	Eucrite-unbr
Sayh al Uhaymir 563	SaU 563	Oman	2009 Oct	1520	Ureilite
Sayh al Uhaymir 566	SaU 566	Oman	2011 Feb	1725	CV3
Sayh al Uhaymir 567	SaU 567	Oman	Jan 2013	1100	H3

Sayh al Uhaymir 568	SaU 568	Oman	Jan 2013	1740	H5
Sayh al Uhaymir 569	SaU 569	Oman	Jan 2013	260	L3
Sayh al Uhaymir 570	SaU 570	Oman	Jan 2013	315	L4
Sayh al Uhaymir 571	SaU 571	Oman	Jan 2013	1578	L3
Sayh al Uhaymir 572	SaU 572	Oman	2013	1070	H6
Sayh al Uhaymir 573	SaU 573	Oman	2013	2948	L4
Sayh al Uhaymir 574	SaU 574	Oman	2013	728	L4
Shalim 021		Oman	2011 Feb 01	104.5	H3-5
Shişr 177		Oman	2009 Oct 6	195	H3
Shişr 178		Oman	Jan 2013	460	L5
Shişr 179		Oman	Jan 2013	480	H4
Slaton (b)		United States	1940s	6000	Iron, IIAB
Smokey Spring		United States	Oct 2011	254	H4
Steingarden Nunataks 07001	STG 07001	Antarctica	2007	454.8	L6
Steingarden Nunataks 07002	STG 07002	Antarctica	2007	21.88	L6
Steingarden Nunataks 07003	STG 07003	Antarctica	2007	11.95	L6
Steingarden Nunataks 07004	STG 07004	Antarctica	2007	17.55	L6
Steingarden Nunataks 07005	STG 07005	Antarctica	2007	83.33	H4
Steingarden Nunataks 07006	STG 07006	Antarctica	2007	287.82	L5
Steingarden Nunataks 07008	STG 07008	Antarctica	2007	225.12	H4
Steingarden Nunataks 07010	STG 07010	Antarctica	2007	21.87	H6
Steingarden Nunataks 07011	STG 07011	Antarctica	2007	15.43	LL4/5
Steingarden Nunataks 07012	STG 07012	Antarctica	2007	11.42	L5/6
Steingarden Nunataks 07013	STG 07013	Antarctica	2007	188.6	H5
Steingarden Nunataks 07015	STG 07015	Antarctica	2007	5.09	L6
Steingarden Nunataks 07016	STG 07016	Antarctica	2007	1.94	L6
Stewart Valley 013	StV 013	United States	2003 Oct 30	664.7	H6
Stewart Valley 014	StV 014	United States	2003 Nov 1	54.3	LL4
Stewart Valley 015	StV 015	United States	2003 Nov 15	1070	H6
Stewart Valley 016	StV 016	United States	2006 Apr 16	39.1	H6
Stewart Valley 017	StV 017	United States	2006 Oct 21	156	L6
Stewart Valley 018	StV 018	United States	2007 Mar 3	9.9	H6
Stewart Valley 019	StV 019	United States	2007 Mar 18	6.6	L4
Stewart Valley 020	StV 020	United States	2008 Apr 17	15.3	L6

Stewart Valley 021	StV 021	United States	27 Apr 2013	5.6	H5
Stewart Valley 022	StV 022	United States	2013 Apr 27	2.835	LL6
Sunfair		United States	2006 Apr 16	49.8	L6
Szabo Bluff 12430	SZA 12430	Antarctica	2012	412.1	CK4
Szabo Bluff 12431	SZA 12431	Antarctica	2012	443.1	CO3
Szabo Bluff 12432	SZA 12432	Antarctica	2012	163.3	CO3
Timber Lake		United States	2011 May	8660	H3
Tongan		China	1996	~500 kg	Iron, IAB-MG
Tule Valley Hardpan 003	TVH 003	United States	2007 May 12	10.7	H5
Tule Valley Hardpan 004	TVH 004	United States	2007 May 12	37.5	H5
Tule Valley Hardpan 005	TVH 005	United States	2007 May 12	29.5	H6
Tule Valley Hardpan 006	TVH 006	United States	2007 Oct 13	2.6	H6
Umm as Samim 033	UaS 033	Oman	2013	360	L6
Watson 013		Australia	14 Apr 2010	47.1	H3
Willcox Playa 010		United States	25 June 2006	22.3	Lodranite
Williams		United States	2012 Oct	1030	H4
Winner		United States	Aug 2004	8502	L3.9
Xingdi 001		China	2012 Nov 25	144.8	L5
Xingdi 002		China	2012 Nov 25	25.3	H4
Xining		China	11 Feb 2012	>100 kg	L5
Yamato 980648	Y-980648	Antarctica	1998	50.67	H5
Yamato 980694	Y-980694	Antarctica	1998	9.467	Diogenite
Yamato 980764	Y-980764	Antarctica	1998	6.759	Acapulcoite
Yamato 981408	Y-981408	Antarctica	1998	9.991	H5
Yamato 981439	Y-981439	Antarctica	1998	3.820	H5
Yamato 981444	Y-981444	Antarctica	1998	4.269	H5
Yamato 981445	Y-981445	Antarctica	1998	3.526	L6
Yamato 981462	Y-981462	Antarctica	1998	3.554	H5
Yamato 981465	Y-981465	Antarctica	1998	4.615	H5
Yamato 981466	Y-981466	Antarctica	1998	3.290	H4
Yamato 981491	Y-981491	Antarctica	1998	3.640	H5
Yamato 981500	Y-981500	Antarctica	1998	3.020	L6
Yamato 981508	Y-981508	Antarctica	1998	3.034	H5
Yamato 981517	Y-981517	Antarctica	1998	4.387	L6
Yamato 981520	Y-981520	Antarctica	1998	3.054	H5
Yamato 981528	Y-981528	Antarctica	1998	3.641	L6
Yamato 981529	Y-981529	Antarctica	1998	3.859	H4
Yamato 981535	Y-981535	Antarctica	1998	3.294	H5
Yamato 981542	Y-981542	Antarctica	1998	3.943	L6
Yamato 981543	Y-981543	Antarctica	1998	4.971	H5
Yamato 981544	Y-981544	Antarctica	1998	4.243	LL4
Yamato 981546	Y-981546	Antarctica	1998	3.185	L5
Yamato 981561	Y-981561	Antarctica	1998	3.897	H5
Yamato 981562	Y-981562	Antarctica	1998	3.492	H5

Yamato 981566	Y-981566	Antarctica	1998	3.611	H5
Yamato 981572	Y-981572	Antarctica	1998	4.759	H5
Yamato 981573	Y-981573	Antarctica	1998	4.500	H5
Yamato 981587	Y-981587	Antarctica	1998	3.593	H5
Yamato 981590	Y-981590	Antarctica	1998	3.296	L4
Yamato 981599	Y-981599	Antarctica	1998	4.768	L5
Yamato 981609	Y-981609	Antarctica	1998	4.440	H5
Yamato 981612	Y-981612	Antarctica	1998	3.292	H4
Yamato 981620	Y-981620	Antarctica	1998	4.668	Eucrite
Yamato 981622	Y-981622	Antarctica	1998	4.906	Eucrite
Yamato 981647	Y-981647	Antarctica	1998	13.02	L3
Yamato 981648	Y-981648	Antarctica	1998	5.886	H5
Yamato 981652	Y-981652	Antarctica	1998	6.010	Eucrite
Yamato 981653	Y-981653	Antarctica	1998	3.641	L4
Yamato 981655	Y-981655	Antarctica	1998	3.461	H6
Yamato 981669	Y-981669	Antarctica	1998	5.516	Eucrite
Yamato 981701	Y-981701	Antarctica	1998	3.981	LL5
Yamato 981707	Y-981707	Antarctica	1998	4.121	L6
Yamato 981714	Y-981714	Antarctica	1998	9.885	H4
Yamato 981720	Y-981720	Antarctica	1998	4.796	CM
Yamato 981726	Y-981726	Antarctica	1998	5.924	Eucrite
Yamato 981729	Y-981729	Antarctica	1998	4.309	LL6
Yamato 981767	Y-981767	Antarctica	1998	3.217	L6
Yamato 981768	Y-981768	Antarctica	1998	3.067	L6
Yamato 981780	Y-981780	Antarctica	1998	3.228	H5
Yamato 981837	Y-981837	Antarctica	1998	4.996	H4
Yamato 981839	Y-981839	Antarctica	1998	4.320	H4
Yamato 981840	Y-981840	Antarctica	1998	4.861	H5
Yamato 981841	Y-981841	Antarctica	1998	4.194	H4
Yamato 981842	Y-981842	Antarctica	1998	2.765	H4
Yamato 981844	Y-981844	Antarctica	1998	3.614	H5
Yamato 981849	Y-981849	Antarctica	1998	3.086	H4
Yamato 981864	Y-981864	Antarctica	1998	4.119	H5
Yamato 981866	Y-981866	Antarctica	1998	3.964	H4
Yamato 981867	Y-981867	Antarctica	1998	3.306	H5
Yamato 982717	Y-982717	Antarctica	1998	10.27	H4-an
Yamato 983131	Y-983131	Antarctica	1998	4.350	H-melt breccia
Yamato 983138	Y-983138	Antarctica	1998	27.19	H6
Yamato 983237	Y-983237	Antarctica	1998	6.193	Acapulcoite
Yamato 983760	Y-983760	Antarctica	1998	14.68	Eucrite-pmict
Yamato 984084	Y-984084	Antarctica	1998	3.903	R4-5
Yamato 000001	Y-000001	Antarctica	2000	50.13	L5
Yamato 000002	Y-000002	Antarctica	2000	19.33	L4
Yamato 000003	Y-000003	Antarctica	2000	79.01	L6

Yamato 000004	Y-000004	Antarctica	2000	490.6	L6
Yamato 000005	Y-000005	Antarctica	2000	34.39	H4
Yamato 000007	Y-000007	Antarctica	2000	34.57	L5
Yamato 000016	Y-000016	Antarctica	2000	19.61	H5
Yamato 000017	Y-000017	Antarctica	2000	5.569	H5
Yamato 000019	Y-000019	Antarctica	2000	13.16	H5
Yamato 000020	Y-000020	Antarctica	2000	11.32	H4
Yamato 000024	Y-000024	Antarctica	2000	5.189	H5
Yamato 000028	Y-000028	Antarctica	2000	57.68	H4
Yamato 000034	Y-000034	Antarctica	2000	46.77	H4
Yamato 000038	Y-000038	Antarctica	2000	22.93	H6
Yamato 000044	Y-000044	Antarctica	2000	5.176	H5
Yamato 000048	Y-000048	Antarctica	2000	27.70	L6
Yamato 000049	Y-000049	Antarctica	2000	6.599	H3
Yamato 000062	Y-000062	Antarctica	2000	38.05	L5
Yamato 000063	Y-000063	Antarctica	2000	56.01	H5
Yamato 000065	Y-000065	Antarctica	2000	6.904	H5
Yamato 000068	Y-000068	Antarctica	2000	262.4	L5
Yamato 000071	Y-000071	Antarctica	2000	9.654	H4
Yamato 000072	Y-000072	Antarctica	2000	6.190	H4
Yamato 000075	Y-000075	Antarctica	2000	18.14	H4
Yamato 000084	Y-000084	Antarctica	2000	11.42	L6
Yamato 000085	Y-000085	Antarctica	2000	13.58	L3
Yamato 000087	Y-000087	Antarctica	2000	6.375	H4
Yamato 000089	Y-000089	Antarctica	2000	13.18	LL4
Yamato 000091	Y-000091	Antarctica	2000	44.81	L5
Yamato 000093	Y-000093	Antarctica	2000	8.902	L5
Yamato 000094	Y-000094	Antarctica	2000	18.87	L5
Yamato 000095	Y-000095	Antarctica	2000	22.45	L5
Yamato 000096	Y-000096	Antarctica	2000	19.88	H3
Yamato 000102	Y-000102	Antarctica	2000	12.53	H5-6
Yamato 000106	Y-000106	Antarctica	2000	6.505	H4
Yamato 000107	Y-000107	Antarctica	2000	18.61	H4
Yamato 000111	Y-000111	Antarctica	2000	46.11	H4
Yamato 000117	Y-000117	Antarctica	2000	6.217	Howardite
Yamato 000118	Y-000118	Antarctica	2000	15.96	L3
Yamato 000128	Y-000128	Antarctica	2000	24.82	H4
Yamato 000129	Y-000129	Antarctica	2000	11.33	L3
Yamato 000130	Y-000130	Antarctica	2000	8.364	L-melt breccia
Yamato 000134	Y-000134	Antarctica	2000	139.7	L6
Yamato 000135	Y-000135	Antarctica	2000	195.6	L6
Yamato 000136	Y-000136	Antarctica	2000	51.68	L5
Yamato 000137	Y-000137	Antarctica	2000	23.59	Mesosiderite
Yamato 000138	Y-000138	Antarctica	2000	35.45	Eucrite-melt breccia

Yamato 000139	Y-000139	Antarctica	2000	9.656	LL5
Yamato 000140	Y-000140	Antarctica	2000	8.135	L5
Yamato 000141	Y-000141	Antarctica	2000	5.751	H4
Yamato 000144	Y-000144	Antarctica	2000	10.42	H4
Yamato 000149	Y-000149	Antarctica	2000	84.63	H4
Yamato 000150	Y-000150	Antarctica	2000	142.2	L5
Yamato 000153	Y-000153	Antarctica	2000	23.42	H4
Yamato 000154	Y-000154	Antarctica	2000	160.5	L6
Yamato 000155	Y-000155	Antarctica	2000	7.475	L6
Yamato 000156	Y-000156	Antarctica	2000	30.18	Diogenite
Yamato 000157	Y-000157	Antarctica	2000	12.82	L6
Yamato 000164	Y-000164	Antarctica	2000	7.424	H5
Yamato 000181	Y-000181	Antarctica	2000	20.64	L6
Yamato 000184	Y-000184	Antarctica	2000	10.06	H4
Yamato 000186	Y-000186	Antarctica	2000	5.930	H4
Yamato 000190	Y-000190	Antarctica	2000	5.135	H5
Yamato 000192	Y-000192	Antarctica	2000	16.27	L5
Yamato 000196	Y-000196	Antarctica	2000	143.2	H4
Yamato 000199	Y-000199	Antarctica	2000	6.127	L5
Yamato 000200	Y-000200	Antarctica	2000	12.86	H3
Yamato 000201	Y-000201	Antarctica	2000	124.8	L6
Yamato 000202	Y-000202	Antarctica	2000	104.9	H4
Yamato 000205	Y-000205	Antarctica	2000	13.21	L6
Yamato 000214	Y-000214	Antarctica	2000	15.03	L5
Yamato 000217	Y-000217	Antarctica	2000	10.50	H4-6
Yamato 000218	Y-000218	Antarctica	2000	15.04	L6
Yamato 000220	Y-000220	Antarctica	2000	23.14	L5
Yamato 000223	Y-000223	Antarctica	2000	100.0	Howardite
Yamato 000227	Y-000227	Antarctica	2000	43.13	H4
Yamato 000228	Y-000228	Antarctica	2000	172.2	H4
Yamato 000229	Y-000229	Antarctica	2000	35.68	H4
Yamato 000230	Y-000230	Antarctica	2000	13.09	H4
Yamato 000233	Y-000233	Antarctica	2000	29.47	H4
Yamato 000236	Y-000236	Antarctica	2000	5.878	L4
Yamato 000237	Y-000237	Antarctica	2000	16.59	H4
Yamato 000239	Y-000239	Antarctica	2000	24.99	H4
Yamato 000245	Y-000245	Antarctica	2000	156.4	Diogenite
Yamato 000248	Y-000248	Antarctica	2000	9.636	Eucrite
Yamato 000249	Y-000249	Antarctica	2000	14.46	L6
Yamato 000250	Y-000250	Antarctica	2000	6.038	H4
Yamato 000253	Y-000253	Antarctica	2000	13.00	Eucrite
Yamato 000255	Y-000255	Antarctica	2000	9.455	H4
Yamato 000259	Y-000259	Antarctica	2000	52.84	L6
Yamato 000260	Y-000260	Antarctica	2000	10.48	H4

Yamato 000262	Y-000262	Antarctica	2000	9.731	H5
Yamato 000265	Y-000265	Antarctica	2000	15.91	H4
Yamato 000274	Y-000274	Antarctica	2000	15.77	H4
Yamato 000275	Y-000275	Antarctica	2000	29.64	H4
Yamato 000276	Y-000276	Antarctica	2000	11.74	H4
Yamato 000277	Y-000277	Antarctica	2000	9.193	H4
Yamato 000278	Y-000278	Antarctica	2000	33.97	H4
Yamato 000280	Y-000280	Antarctica	2000	15.61	H6
Yamato 000281	Y-000281	Antarctica	2000	18.63	L5
Yamato 000282	Y-000282	Antarctica	2000	13.66	H5
Yamato 000284	Y-000284	Antarctica	2000	15.45	H5
Yamato 000285	Y-000285	Antarctica	2000	7.447	H4
Yamato 000289	Y-000289	Antarctica	2000	7.999	L6
Yamato 000290	Y-000290	Antarctica	2000	158.7	H4
Yamato 000292	Y-000292	Antarctica	2000	16.38	Diogenite
Yamato 000295	Y-000295	Antarctica	2000	7.042	H4
Yamato 000296	Y-000296	Antarctica	2000	15.91	H5
Yamato 000297	Y-000297	Antarctica	2000	17.53	H4
Yamato 000298	Y-000298	Antarctica	2000	6.298	H4
Yamato 000299	Y-000299	Antarctica	2000	8.479	H4
Yamato 000306	Y-000306	Antarctica	2000	6.767	Eucrite-melt breccia
Yamato 000307	Y-000307	Antarctica	2000	17.04	Eucrite-melt breccia
Yamato 000308	Y-000308	Antarctica	2000	160.5	Diogenite
Yamato 000309	Y-000309	Antarctica	2000	153.4	L5
Yamato 000310	Y-000310	Antarctica	2000	76.83	L5
Yamato 000312	Y-000312	Antarctica	2000	10.48	H5
Yamato 000313	Y-000313	Antarctica	2000	33.38	Eucrite-br
Yamato 000314	Y-000314	Antarctica	2000	95.29	L5
Yamato 000315	Y-000315	Antarctica	2000	14.21	H4
Yamato 000316	Y-000316	Antarctica	2000	27.31	Diogenite
Yamato 000317	Y-000317	Antarctica	2000	11.92	H5
Yamato 000318	Y-000318	Antarctica	2000	19.29	L5
Yamato 000319	Y-000319	Antarctica	2000	15.04	L5
Yamato 000320	Y-000320	Antarctica	2000	5.087	H
Yamato 000321	Y-000321	Antarctica	2000	18.69	H4
Yamato 000322	Y-000322	Antarctica	2000	92.09	H4
Yamato 000324	Y-000324	Antarctica	2000	37.75	H5
Yamato 000325	Y-000325	Antarctica	2000	5.186	H5
Yamato 000326	Y-000326	Antarctica	2000	16.00	H5
Yamato 000328	Y-000328	Antarctica	2000	31.31	H5
Yamato 000329	Y-000329	Antarctica	2000	162.4	LL6
Yamato 000330	Y-000330	Antarctica	2000	16.41	H4-5
Yamato 000333	Y-000333	Antarctica	2000	30.83	Howardite
Yamato 000334	Y-000334	Antarctica	2000	37.56	Howardite

Yamato 000335	Y-000335	Antarctica	2000	5.015	H5
Yamato 000336	Y-000336	Antarctica	2000	7.865	H4
Yamato 000337	Y-000337	Antarctica	2000	41.12	H5
Yamato 000338	Y-000338	Antarctica	2000	41.92	L6
Yamato 000340	Y-000340	Antarctica	2000	6.549	H5
Yamato 000341	Y-000341	Antarctica	2000	141.3	L5
Yamato 000342	Y-000342	Antarctica	2000	29.05	Diogenite
Yamato 000343	Y-000343	Antarctica	2000	44.68	H5
Yamato 000345	Y-000345	Antarctica	2000	16.31	H5
Yamato 000346	Y-000346	Antarctica	2000	19.71	H5
Yamato 000347	Y-000347	Antarctica	2000	50.85	H5
Yamato 000351	Y-000351	Antarctica	2000	10.81	L5
Yamato 000352	Y-000352	Antarctica	2000	44.99	H4
Yamato 000353	Y-000353	Antarctica	2000	17.52	L6
Yamato 000354	Y-000354	Antarctica	2000	29.31	L5
Yamato 000355	Y-000355	Antarctica	2000	5.625	H6
Yamato 000356	Y-000356	Antarctica	2000	7.535	H4
Yamato 000357	Y-000357	Antarctica	2000	203.3	L6
Yamato 000358	Y-000358	Antarctica	2000	58.18	L6
Yamato 000359	Y-000359	Antarctica	2000	25.11	H4
Yamato 000360	Y-000360	Antarctica	2000	5.067	H4
Yamato 000361	Y-000361	Antarctica	2000	5.231	L6
Yamato 000362	Y-000362	Antarctica	2000	9.717	Diogenite
Yamato 000363	Y-000363	Antarctica	2000	9.235	H4/5
Yamato 000365	Y-000365	Antarctica	2000	16.93	H4
Yamato 000368	Y-000368	Antarctica	2000	8.505	H4
Yamato 000370	Y-000370	Antarctica	2000	9.141	H4
Yamato 000373	Y-000373	Antarctica	2000	9.528	L6
Yamato 000376	Y-000376	Antarctica	2000	7.384	H5
Yamato 000377	Y-000377	Antarctica	2000	20.87	H4
Yamato 000379	Y-000379	Antarctica	2000	24.49	L6
Yamato 000380	Y-000380	Antarctica	2000	10.21	L3
Yamato 000382	Y-000382	Antarctica	2000	6.092	L6
Yamato 000383	Y-000383	Antarctica	2000	12.12	H5
Yamato 000384	Y-000384	Antarctica	2000	11.41	H4
Yamato 000385	Y-000385	Antarctica	2000	23.47	L6
Yamato 000386	Y-000386	Antarctica	2000	17.94	H4/5
Yamato 000387	Y-000387	Antarctica	2000	6.994	L6
Yamato 000388	Y-000388	Antarctica	2000	19.77	L6
Yamato 000389	Y-000389	Antarctica	2000	7.902	H4
Yamato 000390	Y-000390	Antarctica	2000	12.14	L5/6
Yamato 000391	Y-000391	Antarctica	2000	8.159	H5
Yamato 000393	Y-000393	Antarctica	2000	9.281	H4
Yamato 000395	Y-000395	Antarctica	2000	11.75	H5

Yamato 000396	Y-000396	Antarctica	2000	11.01	L6
Yamato 000397	Y-000397	Antarctica	2000	8.220	H5
Yamato 000399	Y-000399	Antarctica	2000	5.981	H4
Yamato 000402	Y-000402	Antarctica	2000	9.822	Diogenite
Yamato 000403	Y-000403	Antarctica	2000	10.90	H4
Yamato 000404	Y-000404	Antarctica	2000	37.98	H4
Yamato 000405	Y-000405	Antarctica	2000	13.04	Diogenite
Yamato 000406	Y-000406	Antarctica	2000	97.57	H6
Yamato 000407	Y-000407	Antarctica	2000	27.77	H6
Yamato 000408	Y-000408	Antarctica	2000	222.1	L5
Yamato 000409	Y-000409	Antarctica	2000	8.885	H4
Yamato 000410	Y-000410	Antarctica	2000	16.26	L6
Yamato 000411	Y-000411	Antarctica	2000	49.11	H3
Yamato 000412	Y-000412	Antarctica	2000	5.998	H4
Yamato 000413	Y-000413	Antarctica	2000	11.71	H4
Yamato 000414	Y-000414	Antarctica	2000	431.9	H4
Yamato 000415	Y-000415	Antarctica	2000	63.85	H4
Yamato 000417	Y-000417	Antarctica	2000	12.22	H4
Yamato 000419	Y-000419	Antarctica	2000	18.48	Diogenite
Yamato 000423	Y-000423	Antarctica	2000	12.03	H4
Yamato 000424	Y-000424	Antarctica	2000	11.27	H4
Yamato 000426	Y-000426	Antarctica	2000	27.75	Howardite
Yamato 000427	Y-000427	Antarctica	2000	9.795	Howardite
Yamato 000428	Y-000428	Antarctica	2000	170.7	Howardite
Yamato 000429	Y-000429	Antarctica	2000	9.575	L5
Yamato 000430	Y-000430	Antarctica	2000	6.794	H5
Yamato 000431	Y-000431	Antarctica	2000	32.55	L6
Yamato 000432	Y-000432	Antarctica	2000	18.74	H4
Yamato 000433	Y-000433	Antarctica	2000	25.86	Diogenite
Yamato 000434	Y-000434	Antarctica	2000	18.00	H5
Yamato 000435	Y-000435	Antarctica	2000	13.66	Diogenite
Yamato 000436	Y-000436	Antarctica	2000	8.467	H4
Yamato 000437	Y-000437	Antarctica	2000	14.59	L6
Yamato 000438	Y-000438	Antarctica	2000	264.3	L6
Yamato 000439	Y-000439	Antarctica	2000	310.4	H4
Yamato 000440	Y-000440	Antarctica	2000	131.8	H4
Yamato 000441	Y-000441	Antarctica	2000	236.8	H4
Yamato 000442	Y-000442	Antarctica	2000	30.09	H4
Yamato 000443	Y-000443	Antarctica	2000	41.66	H4
Yamato 000444	Y-000444	Antarctica	2000	129.9	H4
Yamato 000445	Y-000445	Antarctica	2000	9.154	Diogenite
Yamato 000446	Y-000446	Antarctica	2000	7.213	Diogenite
Yamato 000448	Y-000448	Antarctica	2000	16.75	L6
Yamato 000449	Y-000449	Antarctica	2000	15.63	Diogenite

Yamato 000450	Y-000450	Antarctica	2000	24.30	L5
Yamato 000451	Y-000451	Antarctica	2000	389.3	L6
Yamato 000452	Y-000452	Antarctica	2000	7.454	H3
Yamato 000453	Y-000453	Antarctica	2000	202.9	L5
Yamato 000454	Y-000454	Antarctica	2000	48.39	Diogenite
Yamato 000455	Y-000455	Antarctica	2000	125.6	L6
Yamato 000456	Y-000456	Antarctica	2000	23.32	L6
Yamato 000457	Y-000457	Antarctica	2000	99.71	H4
Yamato 000458	Y-000458	Antarctica	2000	81.89	L6
Yamato 000459	Y-000459	Antarctica	2000	7.594	H4
Yamato 000460	Y-000460	Antarctica	2000	14.00	H4
Yamato 000462	Y-000462	Antarctica	2000	8.123	H5
Yamato 000463	Y-000463	Antarctica	2000	5.983	H4
Yamato 000464	Y-000464	Antarctica	2000	46.17	Eucrite
Yamato 000465	Y-000465	Antarctica	2000	33.80	L6
Yamato 000466	Y-000466	Antarctica	2000	14.42	H4
Yamato 000467	Y-000467	Antarctica	2000	13.27	H4
Yamato 000468	Y-000468	Antarctica	2000	125.9	Diogenite
Yamato 000469	Y-000469	Antarctica	2000	6.778	H-melt breccia
Yamato 000470	Y-000470	Antarctica	2000	402.6	L5
Yamato 000471	Y-000471	Antarctica	2000	40.17	L5
Yamato 000472	Y-000472	Antarctica	2000	30.07	L5
Yamato 000473	Y-000473	Antarctica	2000	5.481	L5
Yamato 000477	Y-000477	Antarctica	2000	5.577	H4
Yamato 000478	Y-000478	Antarctica	2000	7.826	H4
Yamato 000480	Y-000480	Antarctica	2000	271.9	Diogenite
Yamato 000482	Y-000482	Antarctica	2000	282.8	Diogenite
Yamato 000483	Y-000483	Antarctica	2000	154.9	L6
Yamato 000484	Y-000484	Antarctica	2000	41.54	Diogenite
Yamato 000486	Y-000486	Antarctica	2000	13.66	H6
Yamato 000487	Y-000487	Antarctica	2000	21.00	H5
Yamato 000489	Y-000489	Antarctica	2000	22.35	H5
Yamato 000490	Y-000490	Antarctica	2000	11.32	H4
Yamato 000492	Y-000492	Antarctica	2000	102.5	Diogenite
Yamato 000493	Y-000493	Antarctica	2000	12.85	Diogenite
Yamato 000494	Y-000494	Antarctica	2000	10.16	H3
Yamato 000495	Y-000495	Antarctica	2000	17.88	L5
Yamato 000496	Y-000496	Antarctica	2000	12.04	H4
Yamato 000497	Y-000497	Antarctica	2000	8.310	H3
Yamato 000498	Y-000498	Antarctica	2000	22.04	LL5
Yamato 000499	Y-000499	Antarctica	2000	62.71	Howardite
Yamato 000500	Y-000500	Antarctica	2000	9.492	L5
Yamato 000501	Y-000501	Antarctica	2000	8.985	L5
Yamato 000502	Y-000502	Antarctica	2000	18.60	H4

Yamato 000503	Y-000503	Antarctica	2000	5.229	H6
Yamato 000504	Y-000504	Antarctica	2000	9.174	H6
Yamato 000506	Y-000506	Antarctica	2000	14.25	Diogenite
Yamato 000508	Y-000508	Antarctica	2000	5.553	L5
Yamato 000509	Y-000509	Antarctica	2000	10.40	Eucrite-pmict
Yamato 000511	Y-000511	Antarctica	2000	13.42	H5
Yamato 000512	Y-000512	Antarctica	2000	5.621	H5
Yamato 000514	Y-000514	Antarctica	2000	104.7	H5
Yamato 000515	Y-000515	Antarctica	2000	33.90	H5
Yamato 000516	Y-000516	Antarctica	2000	20.63	H5
Yamato 000518	Y-000518	Antarctica	2000	9.593	H4/5
Yamato 000520	Y-000520	Antarctica	2000	7.481	H6
Yamato 000522	Y-000522	Antarctica	2000	26.38	H5
Yamato 000523	Y-000523	Antarctica	2000	23.17	Howardite
Yamato 000524	Y-000524	Antarctica	2000	14.75	L6
Yamato 000525	Y-000525	Antarctica	2000	9.290	H6
Yamato 000526	Y-000526	Antarctica	2000	6.041	H4/5
Yamato 000527	Y-000527	Antarctica	2000	42.53	Howardite
Yamato 000528	Y-000528	Antarctica	2000	22.08	Howardite
Yamato 000529	Y-000529	Antarctica	2000	70.49	Howardite
Yamato 000534	Y-000534	Antarctica	2000	5.757	H5
Yamato 000535	Y-000535	Antarctica	2000	5.927	Diogenite
Yamato 000536	Y-000536	Antarctica	2000	12.53	H5
Yamato 000538	Y-000538	Antarctica	2000	11.20	L5/6
Yamato 000539	Y-000539	Antarctica	2000	41.53	Eucrite-br
Yamato 000540	Y-000540	Antarctica	2000	44.81	Diogenite
Yamato 000542	Y-000542	Antarctica	2000	6.933	H5
Yamato 000543	Y-000543	Antarctica	2000	21.03	H5
Yamato 000545	Y-000545	Antarctica	2000	6.098	L6
Yamato 000548	Y-000548	Antarctica	2000	92.33	H6
Yamato 000549	Y-000549	Antarctica	2000	11.33	L5/6
Yamato 000550	Y-000550	Antarctica	2000	5.658	H5
Yamato 000552	Y-000552	Antarctica	2000	8.133	L5
Yamato 000553	Y-000553	Antarctica	2000	94.80	Diogenite
Yamato 000554	Y-000554	Antarctica	2000	15.24	H4
Yamato 000556	Y-000556	Antarctica	2000	6.500	L5
Yamato 000557	Y-000557	Antarctica	2000	6.055	L5
Yamato 000558	Y-000558	Antarctica	2000	11.52	H4
Yamato 000559	Y-000559	Antarctica	2000	5.843	H4
Yamato 000560	Y-000560	Antarctica	2000	7.843	H4
Yamato 000561	Y-000561	Antarctica	2000	15.29	Diogenite
Yamato 000562	Y-000562	Antarctica	2000	17.33	H5
Yamato 000563	Y-000563	Antarctica	2000	6.832	H4
Yamato 000564	Y-000564	Antarctica	2000	8.682	H5

Yamato 000565	Y-000565	Antarctica	2000	5.602	H4
Yamato 000566	Y-000566	Antarctica	2000	47.19	H6
Yamato 000568	Y-000568	Antarctica	2000	24.12	L6
Yamato 000569	Y-000569	Antarctica	2000	13.00	H3
Yamato 000570	Y-000570	Antarctica	2000	12.49	H5
Yamato 000574	Y-000574	Antarctica	2000	12.61	Diogenite
Yamato 000576	Y-000576	Antarctica	2000	15.51	L5
Yamato 000577	Y-000577	Antarctica	2000	7.049	Howardite
Yamato 000578	Y-000578	Antarctica	2000	13.69	L6
Yamato 000579	Y-000579	Antarctica	2000	15.97	L6
Yamato 000580	Y-000580	Antarctica	2000	410.8	H4
Yamato 000584	Y-000584	Antarctica	2000	45.95	Howardite
Yamato 000585	Y-000585	Antarctica	2000	9.492	H-melt breccia
Yamato 000586	Y-000586	Antarctica	2000	10.78	L5
Yamato 000588	Y-000588	Antarctica	2000	79.37	Diogenite
Yamato 000589	Y-000589	Antarctica	2000	9.356	H4
Yamato 000590	Y-000590	Antarctica	2000	88.64	H4
Yamato 000591	Y-000591	Antarctica	2000	17.70	H4
Yamato 000592	Y-000592	Antarctica	2000	26.76	Howardite
Yamato 000595	Y-000595	Antarctica	2000	137.0	L6
Yamato 000596	Y-000596	Antarctica	2000	103.6	Howardite
Yamato 000597	Y-000597	Antarctica	2000	8.573	L6
Yamato 000598	Y-000598	Antarctica	2000	47.93	L6
Yamato 000599	Y-000599	Antarctica	2000	54.07	L4
Yamato 000601	Y-000601	Antarctica	2000	22.26	H-melt breccia
Yamato 000603	Y-000603	Antarctica	2000	11.61	Howardite
Yamato 000605	Y-000605	Antarctica	2000	7.738	Howardite
Yamato 000606	Y-000606	Antarctica	2000	7.746	H5
Yamato 000607	Y-000607	Antarctica	2000	26.27	H5
Yamato 000609	Y-000609	Antarctica	2000	8.549	L5
Yamato 000611	Y-000611	Antarctica	2000	28.94	H4/5
Yamato 000613	Y-000613	Antarctica	2000	20.98	H5
Yamato 000616	Y-000616	Antarctica	2000	11.68	L6
Yamato 000617	Y-000617	Antarctica	2000	13.30	H4
Yamato 000619	Y-000619	Antarctica	2000	9.690	H4
Yamato 000620	Y-000620	Antarctica	2000	5.643	H4
Yamato 000621	Y-000621	Antarctica	2000	21.64	H5
Yamato 000625	Y-000625	Antarctica	2000	8.003	H5
Yamato 000626	Y-000626	Antarctica	2000	27.77	L6
Yamato 000627	Y-000627	Antarctica	2000	21.23	L6
Yamato 000630	Y-000630	Antarctica	2000	8.553	H5
Yamato 000631	Y-000631	Antarctica	2000	10.98	Diogenite
Yamato 000632	Y-000632	Antarctica	2000	6.934	L5
Yamato 000634	Y-000634	Antarctica	2000	5.560	H4/5

Yamato 000635	Y-000635	Antarctica	2000	6.656	H4/5
Yamato 000637	Y-000637	Antarctica	2000	9.015	Diogenite
Yamato 000638	Y-000638	Antarctica	2000	31.69	Eucrite-br
Yamato 000640	Y-000640	Antarctica	2000	9.103	L5
Yamato 000641	Y-000641	Antarctica	2000	491.8	L6
Yamato 000642	Y-000642	Antarctica	2000	90.24	Diogenite
Yamato 000643	Y-000643	Antarctica	2000	31.41	Diogenite
Yamato 000644	Y-000644	Antarctica	2000	81.92	Diogenite
Yamato 000645	Y-000645	Antarctica	2000	54.18	L6
Yamato 000646	Y-000646	Antarctica	2000	7.948	H-melt breccia
Yamato 000647	Y-000647	Antarctica	2000	27.28	L6
Yamato 000648	Y-000648	Antarctica	2000	45.37	L-melt breccia
Yamato 000650	Y-000650	Antarctica	2000	30.78	L5
Yamato 000653	Y-000653	Antarctica	2000	5.009	Eucrite-br
Yamato 000654	Y-000654	Antarctica	2000	6.802	H4
Yamato 000655	Y-000655	Antarctica	2000	16.64	H6
Yamato 000656	Y-000656	Antarctica	2000	9.784	H5
Yamato 000657	Y-000657	Antarctica	2000	24.16	L6
Yamato 000659	Y-000659	Antarctica	2000	19.04	H5
Yamato 000660	Y-000660	Antarctica	2000	5.559	L6-melt breccia
Yamato 000661	Y-000661	Antarctica	2000	20.56	L6
Yamato 000662	Y-000662	Antarctica	2000	25.42	H4
Yamato 000663	Y-000663	Antarctica	2000	6.210	H6
Yamato 000664	Y-000664	Antarctica	2000	5.081	H4
Yamato 000665	Y-000665	Antarctica	2000	45.13	Eucrite-pmict
Yamato 000668	Y-000668	Antarctica	2000	19.50	Eucrite-br
Yamato 000669	Y-000669	Antarctica	2000	5.442	L6
Yamato 000671	Y-000671	Antarctica	2000	23.06	H4
Yamato 000672	Y-000672	Antarctica	2000	11.01	H
Yamato 000673	Y-000673	Antarctica	2000	19.66	H4
Yamato 000674	Y-000674	Antarctica	2000	10.36	H4
Yamato 000675	Y-000675	Antarctica	2000	9.137	H-melt breccia
Yamato 000676	Y-000676	Antarctica	2000	6.441	H4
Yamato 000677	Y-000677	Antarctica	2000	31.91	H4
Yamato 000678	Y-000678	Antarctica	2000	11.44	H5
Yamato 000679	Y-000679	Antarctica	2000	7.046	H6
Yamato 000683	Y-000683	Antarctica	2000	14.69	Diogenite
Yamato 000684	Y-000684	Antarctica	2000	5.606	H4
Yamato 000685	Y-000685	Antarctica	2000	13.15	H5
Yamato 000687	Y-000687	Antarctica	2000	16.08	H5
Yamato 000688	Y-000688	Antarctica	2000	19.47	Diogenite
Yamato 000689	Y-000689	Antarctica	2000	18.83	Diogenite
Yamato 000690	Y-000690	Antarctica	2000	16.90	Diogenite
Yamato 000691	Y-000691	Antarctica	2000	33.88	Diogenite

Yamato 000693	Y-000693	Antarctica	2000	18.12	L6
Yamato 000694	Y-000694	Antarctica	2000	11.44	L6
Yamato 000695	Y-000695	Antarctica	2000	20.51	L6
Yamato 000696	Y-000696	Antarctica	2000	20.09	Diogenite
Yamato 000697	Y-000697	Antarctica	2000	25.78	Diogenite
Yamato 000698	Y-000698	Antarctica	2000	19.21	L6
Yamato 000699	Y-000699	Antarctica	2000	69.74	L6
Yamato 000700	Y-000700	Antarctica	2000	56.57	Diogenite
Yamato 000701	Y-000701	Antarctica	2000	21.92	L6
Yamato 000702	Y-000702	Antarctica	2000	5.941	L4
Yamato 000704	Y-000704	Antarctica	2000	32.90	Diogenite
Yamato 000705	Y-000705	Antarctica	2000	8.665	Howardite
Yamato 000706	Y-000706	Antarctica	2000	69.40	Howardite
Yamato 000707	Y-000707	Antarctica	2000	44.07	L6
Yamato 000708	Y-000708	Antarctica	2000	103.2	H4
Yamato 000711	Y-000711	Antarctica	2000	88.75	H6
Yamato 000712	Y-000712	Antarctica	2000	7.689	H5
Yamato 000713	Y-000713	Antarctica	2000	9.154	L5
Yamato 000714	Y-000714	Antarctica	2000	5.086	H5
Yamato 000715	Y-000715	Antarctica	2000	9.336	H5
Yamato 000716	Y-000716	Antarctica	2000	11.21	H5
Yamato 000717	Y-000717	Antarctica	2000	10.04	H5
Yamato 000718	Y-000718	Antarctica	2000	27.53	Howardite
Yamato 000719	Y-000719	Antarctica	2000	57.81	H5
Yamato 000720	Y-000720	Antarctica	2000	50.13	H5
Yamato 000723	Y-000723	Antarctica	2000	39.41	H4
Yamato 000724	Y-000724	Antarctica	2000	32.20	L6
Yamato 000725	Y-000725	Antarctica	2000	6.860	H-melt breccia
Yamato 000726	Y-000726	Antarctica	2000	6.388	H5
Yamato 000727	Y-000727	Antarctica	2000	10.11	H-melt breccia
Yamato 000728	Y-000728	Antarctica	2000	11.21	H4
Yamato 000729	Y-000729	Antarctica	2000	6.845	H5
Yamato 000732	Y-000732	Antarctica	2000	86.79	L6
Yamato 000733	Y-000733	Antarctica	2000	6.526	H6
Yamato 000734	Y-000734	Antarctica	2000	79.63	L6
Yamato 000735	Y-000735	Antarctica	2000	52.64	H-melt breccia
Yamato 000736	Y-000736	Antarctica	2000	11.77	H3
Yamato 000737	Y-000737	Antarctica	2000	11.78	H5
Yamato 000738	Y-000738	Antarctica	2000	46.11	L6
Yamato 000740	Y-000740	Antarctica	2000	7.259	LL
Yamato 000742	Y-000742	Antarctica	2000	5.460	L6
Yamato 000744	Y-000744	Antarctica	2000	102.8	L6-melt breccia
Yamato 000745	Y-000745	Antarctica	2000	7.705	H-melt breccia
Yamato 000746	Y-000746	Antarctica	2000	11.75	H/L4-5

Yamato 000748	Y-000748	Antarctica	2000	12.53	L5
Yamato 000751	Y-000751	Antarctica	2000	12.24	H5
Yamato 000752	Y-000752	Antarctica	2000	37.39	H5
Yamato 000753	Y-000753	Antarctica	2000	90.55	H5
Yamato 000754	Y-000754	Antarctica	2000	62.85	H6
Yamato 000755	Y-000755	Antarctica	2000	123.7	H5
Yamato 000756	Y-000756	Antarctica	2000	559.5	H5
Yamato 000757	Y-000757	Antarctica	2000	51.35	H5
Yamato 000760	Y-000760	Antarctica	2000	9.455	H5
Yamato 000762	Y-000762	Antarctica	2000	53.19	H5
Yamato 000765	Y-000765	Antarctica	2000	15.93	H6
Yamato 000766	Y-000766	Antarctica	2000	32.87	H5
Yamato 000767	Y-000767	Antarctica	2000	11.04	H5
Yamato 000771	Y-000771	Antarctica	2000	12.89	H5
Yamato 000773	Y-000773	Antarctica	2000	14.61	H5
Yamato 000774	Y-000774	Antarctica	2000	19.34	H5
Yamato 000775	Y-000775	Antarctica	2000	106.6	L6
Yamato 000776	Y-000776	Antarctica	2000	5.401	H5
Yamato 000777	Y-000777	Antarctica	2000	165.9	H4
Yamato 000779	Y-000779	Antarctica	2000	185.8	H5
Yamato 000780	Y-000780	Antarctica	2000	45.12	H5
Yamato 000781	Y-000781	Antarctica	2000	5.586	H4
Yamato 000782	Y-000782	Antarctica	2000	27.69	H/L4
Yamato 000783	Y-000783	Antarctica	2000	108.0	H5
Yamato 000784	Y-000784	Antarctica	2000	24.14	H4
Yamato 000785	Y-000785	Antarctica	2000	43.13	H4-6
Yamato 000786	Y-000786	Antarctica	2000	15.05	H5
Yamato 000787	Y-000787	Antarctica	2000	18.06	H5
Yamato 000789	Y-000789	Antarctica	2000	21.52	L6
Yamato 000790	Y-000790	Antarctica	2000	10.57	LL6
Yamato 000792	Y-000792	Antarctica	2000	11.58	L6
Yamato 000793	Y-000793	Antarctica	2000	6.284	Diogenite
Yamato 000794	Y-000794	Antarctica	2000	5.105	H6
Yamato 000796	Y-000796	Antarctica	2000	10.93	L6
Yamato 000797	Y-000797	Antarctica	2000	349.0	H4
Yamato 000799	Y-000799	Antarctica	2000	10.60	Diogenite
Yamato 000803	Y-000803	Antarctica	2000	11.72	L6
Yamato 000804	Y-000804	Antarctica	2000	5.790	L6
Yamato 000805	Y-000805	Antarctica	2000	155.4	Eucrite
Yamato 000807	Y-000807	Antarctica	2000	13.70	H6
Yamato 000808	Y-000808	Antarctica	2000	6.611	H5
Yamato 000809	Y-000809	Antarctica	2000	9.759	L6
Yamato 000813	Y-000813	Antarctica	2000	7.915	H6
Yamato 000814	Y-000814	Antarctica	2000	11.51	L5

Yamato 000815	Y-000815	Antarctica	2000	14.33	L5
Yamato 000816	Y-000816	Antarctica	2000	26.75	L6
Yamato 000817	Y-000817	Antarctica	2000	51.56	H5
Yamato 000818	Y-000818	Antarctica	2000	5.302	H5
Yamato 000819	Y-000819	Antarctica	2000	24.37	L6
Yamato 000821	Y-000821	Antarctica	2000	61.75	Diogenite
Yamato 000823	Y-000823	Antarctica	2000	8.916	H5
Yamato 000824	Y-000824	Antarctica	2000	36.20	L6
Yamato 000825	Y-000825	Antarctica	2000	15.27	H4
Yamato 000826	Y-000826	Antarctica	2000	149.5	H4
Yamato 000827	Y-000827	Antarctica	2000	130.7	L5
Yamato 000828	Y-000828	Antarctica	2000	34.74	Diogenite
Yamato 000829	Y-000829	Antarctica	2000	9.451	H5
Yamato 000830	Y-000830	Antarctica	2000	10.45	H-melt breccia
Yamato 000831	Y-000831	Antarctica	2000	17.19	H5
Yamato 000833	Y-000833	Antarctica	2000	34.85	Diogenite
Yamato 000834	Y-000834	Antarctica	2000	16.02	Diogenite
Yamato 000835	Y-000835	Antarctica	2000	37.15	Diogenite
Yamato 000836	Y-000836	Antarctica	2000	52.00	Diogenite
Yamato 000837	Y-000837	Antarctica	2000	32.17	Diogenite
Yamato 000838	Y-000838	Antarctica	2000	37.30	H4
Yamato 000839	Y-000839	Antarctica	2000	64.13	H5
Yamato 000840	Y-000840	Antarctica	2000	63.03	H5
Yamato 000841	Y-000841	Antarctica	2000	32.64	H5
Yamato 000842	Y-000842	Antarctica	2000	10.38	L6
Yamato 000843	Y-000843	Antarctica	2000	134.0	L6
Yamato 000845	Y-000845	Antarctica	2000	14.70	L6
Yamato 000847	Y-000847	Antarctica	2000	106.2	H5
Yamato 000848	Y-000848	Antarctica	2000	34.41	L6
Yamato 000849	Y-000849	Antarctica	2000	42.73	H5
Yamato 000850	Y-000850	Antarctica	2000	20.70	Eucrite-br
Yamato 000851	Y-000851	Antarctica	2000	14.49	H4
Yamato 000852	Y-000852	Antarctica	2000	28.60	H5
Yamato 000853	Y-000853	Antarctica	2000	25.02	H5
Yamato 000854	Y-000854	Antarctica	2000	16.06	H5
Yamato 000856	Y-000856	Antarctica	2000	20.97	H5
Yamato 000857	Y-000857	Antarctica	2000	69.53	Diogenite
Yamato 000859	Y-000859	Antarctica	2000	7.791	Diogenite
Yamato 000862	Y-000862	Antarctica	2000	5.855	H5
Yamato 000863	Y-000863	Antarctica	2000	5.697	H-melt breccia
Yamato 000864	Y-000864	Antarctica	2000	10.06	H5
Yamato 000865	Y-000865	Antarctica	2000	7.775	H5
Yamato 000866	Y-000866	Antarctica	2000	134.8	H5
Yamato 000867	Y-000867	Antarctica	2000	9.591	H5

Yamato 000868	Y-000868	Antarctica	2000	6.209	Diogenite
Yamato 000870	Y-000870	Antarctica	2000	13.09	L6
Yamato 000871	Y-000871	Antarctica	2000	47.00	H4
Yamato 000872	Y-000872	Antarctica	2000	10.35	H5
Yamato 000874	Y-000874	Antarctica	2000	46.65	Eucrite-br
Yamato 000877	Y-000877	Antarctica	2000	6.791	L6
Yamato 000878	Y-000878	Antarctica	2000	69.16	H
Yamato 000879	Y-000879	Antarctica	2000	59.76	L6
Yamato 000880	Y-000880	Antarctica	2000	13.90	Diogenite
Yamato 000881	Y-000881	Antarctica	2000	23.81	L6
Yamato 000882	Y-000882	Antarctica	2000	8.531	H3
Yamato 000883	Y-000883	Antarctica	2000	32.71	H4
Yamato 000885	Y-000885	Antarctica	2000	29.65	LL6
Yamato 000886	Y-000886	Antarctica	2000	12.08	L3
Yamato 000888	Y-000888	Antarctica	2000	17.70	L6
Yamato 000889	Y-000889	Antarctica	2000	8.655	H4
Yamato 000890	Y-000890	Antarctica	2000	16.43	L6
Yamato 000891	Y-000891	Antarctica	2000	10.42	L6
Yamato 000892	Y-000892	Antarctica	2000	18.55	Diogenite
Yamato 000893	Y-000893	Antarctica	2000	6.124	L6
Yamato 000894	Y-000894	Antarctica	2000	6.872	L6
Yamato 000895	Y-000895	Antarctica	2000	6.496	H5
Yamato 000896	Y-000896	Antarctica	2000	7.377	H5
Yamato 000897	Y-000897	Antarctica	2000	9.531	H5
Yamato 000898	Y-000898	Antarctica	2000	22.98	Diogenite
Yamato 000899	Y-000899	Antarctica	2000	6.524	H5
Yamato 000900	Y-000900	Antarctica	2000	18.24	L6
Yamato 000905	Y-000905	Antarctica	2000	16.95	L6
Yamato 000906	Y-000906	Antarctica	2000	5.953	H-melt breccia
Yamato 000907	Y-000907	Antarctica	2000	16.59	H5
Yamato 000908	Y-000908	Antarctica	2000	7.364	H4
Yamato 000910	Y-000910	Antarctica	2000	14.85	H5
Yamato 000911	Y-000911	Antarctica	2000	8.494	H5
Yamato 000912	Y-000912	Antarctica	2000	8.370	L6
Yamato 000914	Y-000914	Antarctica	2000	23.33	L6-melt breccia
Yamato 000918	Y-000918	Antarctica	2000	12.08	H
Yamato 000920	Y-000920	Antarctica	2000	7.437	H4
Yamato 000922	Y-000922	Antarctica	2000	6.787	H5
Yamato 000925	Y-000925	Antarctica	2000	22.31	L6
Yamato 000926	Y-000926	Antarctica	2000	16.28	Diogenite
Yamato 000927	Y-000927	Antarctica	2000	19.49	H5
Yamato 000928	Y-000928	Antarctica	2000	18.79	Diogenite
Yamato 000929	Y-000929	Antarctica	2000	18.69	H5
Yamato 000932	Y-000932	Antarctica	2000	12.53	L6

Yamato 000933	Y-000933	Antarctica	2000	45.35	H5
Yamato 000934	Y-000934	Antarctica	2000	27.51	H4/5
Yamato 000935	Y-000935	Antarctica	2000	7.158	L6
Yamato 000936	Y-000936	Antarctica	2000	114.8	Howardite
Yamato 000937	Y-000937	Antarctica	2000	49.23	Howardite
Yamato 000938	Y-000938	Antarctica	2000	10.03	H5
Yamato 000939	Y-000939	Antarctica	2000	5.818	H4-6
Yamato 000941	Y-000941	Antarctica	2000	7.149	H5
Yamato 000942	Y-000942	Antarctica	2000	5.800	H6
Yamato 000944	Y-000944	Antarctica	2000	9.379	H5
Yamato 000945	Y-000945	Antarctica	2000	8.510	H-melt breccia
Yamato 000946	Y-000946	Antarctica	2000	15.04	H5
Yamato 000948	Y-000948	Antarctica	2000	9.734	H4
Yamato 000949	Y-000949	Antarctica	2000	12.91	Eucrite-br
Yamato 000950	Y-000950	Antarctica	2000	21.15	H-melt breccia
Yamato 000952	Y-000952	Antarctica	2000	7.593	Howardite
Yamato 000953	Y-000953	Antarctica	2000	9.990	H5
Yamato 000954	Y-000954	Antarctica	2000	14.81	H5
Yamato 000955	Y-000955	Antarctica	2000	6.527	H5
Yamato 000962	Y-000962	Antarctica	2000	9.188	Diogenite
Yamato 000963	Y-000963	Antarctica	2000	12.40	H5
Yamato 000966	Y-000966	Antarctica	2000	10.60	H5
Yamato 000967	Y-000967	Antarctica	2000	13.77	H5
Yamato 000968	Y-000968	Antarctica	2000	12.37	H4
Yamato 000969	Y-000969	Antarctica	2000	6.192	H4
Yamato 000970	Y-000970	Antarctica	2000	14.74	H4
Yamato 000971	Y-000971	Antarctica	2000	11.61	H4
Yamato 000972	Y-000972	Antarctica	2000	7.785	Diogenite
Yamato 000973	Y-000973	Antarctica	2000	10.38	L5
Yamato 000974	Y-000974	Antarctica	2000	20.69	H4
Yamato 000977	Y-000977	Antarctica	2000	115.7	L5
Yamato 000978	Y-000978	Antarctica	2000	9.267	L5
Yamato 000979	Y-000979	Antarctica	2000	24.86	L5
Yamato 000987	Y-000987	Antarctica	2000	22.00	H4
Yamato 000989	Y-000989	Antarctica	2000	11.82	H4
Yamato 000990	Y-000990	Antarctica	2000	5.048	H5
Yamato 000991	Y-000991	Antarctica	2000	14.93	Diogenite
Yamato 000992	Y-000992	Antarctica	2000	7.611	H5
Yamato 000993	Y-000993	Antarctica	2000	15.34	L6
Yamato 000994	Y-000994	Antarctica	2000	19.87	Eucrite
Yamato 000996	Y-000996	Antarctica	2000	41.12	L6
Yamato 000997	Y-000997	Antarctica	2000	16.11	Eucrite
Yamato 000998	Y-000998	Antarctica	2000	23.56	H4
Yamato 000999	Y-000999	Antarctica	2000	10.44	L6

Yamato 001000	Y-001000	Antarctica	2000	21.75	H4
Yamato 001001	Y-001001	Antarctica	2000	23.53	H4
Yamato 001002	Y-001002	Antarctica	2000	47.81	L5
Yamato 001003	Y-001003	Antarctica	2000	12.54	H4
Yamato 001004	Y-001004	Antarctica	2000	7.949	H4
Yamato 001006	Y-001006	Antarctica	2000	5.928	H4
Yamato 001008	Y-001008	Antarctica	2000	12.02	H4
Yamato 001009	Y-001009	Antarctica	2000	6.222	H4
Yamato 001010	Y-001010	Antarctica	2000	17.39	L5
Yamato 001011	Y-001011	Antarctica	2000	10.36	Diogenite
Yamato 001012	Y-001012	Antarctica	2000	14.86	H4
Yamato 001013	Y-001013	Antarctica	2000	8.444	H4
Yamato 001014	Y-001014	Antarctica	2000	10.37	H4
Yamato 001016	Y-001016	Antarctica	2000	17.17	H3
Yamato 001018	Y-001018	Antarctica	2000	10.81	L6
Yamato 001019	Y-001019	Antarctica	2000	7.475	L5
Yamato 001020	Y-001020	Antarctica	2000	9.543	H4-5
Yamato 001021	Y-001021	Antarctica	2000	5.189	L5
Yamato 001024	Y-001024	Antarctica	2000	9.140	H3
Yamato 001025	Y-001025	Antarctica	2000	6.313	L5
Yamato 001026	Y-001026	Antarctica	2000	6.041	L5
Yamato 001030	Y-001030	Antarctica	2000	353.4	H4
Yamato 001031	Y-001031	Antarctica	2000	9.123	H4
Yamato 001032	Y-001032	Antarctica	2000	7.381	L-melt breccia
Yamato 001033	Y-001033	Antarctica	2000	9.303	H4
Yamato 001034	Y-001034	Antarctica	2000	30.27	H5
Yamato 001035	Y-001035	Antarctica	2000	302.4	H3
Yamato 001036	Y-001036	Antarctica	2000	23.08	H3
Yamato 001037	Y-001037	Antarctica	2000	5.798	Diogenite
Yamato 001038	Y-001038	Antarctica	2000	10.64	H4
Yamato 001040	Y-001040	Antarctica	2000	5.068	H5
Yamato 001041	Y-001041	Antarctica	2000	48.72	L3
Yamato 001045	Y-001045	Antarctica	2000	536.3	H4
Yamato 001048	Y-001048	Antarctica	2000	6.428	L6
Yamato 001050	Y-001050	Antarctica	2000	10.55	H4
Yamato 001053	Y-001053	Antarctica	2000	5.135	H4
Yamato 001055	Y-001055	Antarctica	2000	5.105	L6
Yamato 001056	Y-001056	Antarctica	2000	7.032	H4
Yamato 001058	Y-001058	Antarctica	2000	8.281	H4
Yamato 001059	Y-001059	Antarctica	2000	26.45	H4
Yamato 001060	Y-001060	Antarctica	2000	37.54	H4
Yamato 001061	Y-001061	Antarctica	2000	13.27	H5
Yamato 001062	Y-001062	Antarctica	2000	6.368	L6
Yamato 001067	Y-001067	Antarctica	2000	6.062	H6

Yamato 001069	Y-001069	Antarctica	2000	63.01	H4
Yamato 001070	Y-001070	Antarctica	2000	11.25	L5
Yamato 001071	Y-001071	Antarctica	2000	8.677	L6
Yamato 001072	Y-001072	Antarctica	2000	23.78	H6
Yamato 001073	Y-001073	Antarctica	2000	21.78	L6
Yamato 001074	Y-001074	Antarctica	2000	51.99	Howardite
Yamato 001075	Y-001075	Antarctica	2000	13.64	H3
Yamato 001077	Y-001077	Antarctica	2000	8.650	H4
Yamato 001079	Y-001079	Antarctica	2000	10.95	L6
Yamato 001081	Y-001081	Antarctica	2000	74.25	L6
Yamato 001082	Y-001082	Antarctica	2000	7.445	L5
Yamato 001083	Y-001083	Antarctica	2000	5.866	L4
Yamato 001084	Y-001084	Antarctica	2000	5.613	Eucrite
Yamato 001086	Y-001086	Antarctica	2000	8.314	LL3
Yamato 001091	Y-001091	Antarctica	2000	5.947	H4
Yamato 001092	Y-001092	Antarctica	2000	6.756	H5
Yamato 001093	Y-001093	Antarctica	2000	7.304	L5
Yamato 001094	Y-001094	Antarctica	2000	10.61	H3
Yamato 001095	Y-001095	Antarctica	2000	7.471	H4
Yamato 001098	Y-001098	Antarctica	2000	14.42	H6
Yamato 001107	Y-001107	Antarctica	2000	9.137	H4
Yamato 001109	Y-001109	Antarctica	2000	46.62	H4
Yamato 001110	Y-001110	Antarctica	2000	7.852	H4
Yamato 001111	Y-001111	Antarctica	2000	22.64	H5
Yamato 001113	Y-001113	Antarctica	2000	11.46	L6
Yamato 001114	Y-001114	Antarctica	2000	5.058	H4
Yamato 001115	Y-001115	Antarctica	2000	9.464	L5
Yamato 001116	Y-001116	Antarctica	2000	8.774	Eucrite
Yamato 001118	Y-001118	Antarctica	2000	5.855	H4
Yamato 001120	Y-001120	Antarctica	2000	5.025	LL5
Yamato 001121	Y-001121	Antarctica	2000	113.5	L6
Yamato 001124	Y-001124	Antarctica	2000	8.460	LL5
Yamato 001125	Y-001125	Antarctica	2000	5.032	H5
Yamato 001127	Y-001127	Antarctica	2000	12.17	L5
Yamato 001128	Y-001128	Antarctica	2000	6.092	H4
Yamato 001129	Y-001129	Antarctica	2000	27.04	L6
Yamato 001132	Y-001132	Antarctica	2000	16.38	H5
Yamato 001133	Y-001133	Antarctica	2000	11.60	L6
Yamato 001134	Y-001134	Antarctica	2000	6.523	L6
Yamato 001135	Y-001135	Antarctica	2000	17.68	L5
Yamato 001136	Y-001136	Antarctica	2000	33.79	L5
Yamato 001137	Y-001137	Antarctica	2000	6.132	H4
Yamato 001138	Y-001138	Antarctica	2000	29.76	L6
Yamato 001139	Y-001139	Antarctica	2000	21.33	H4

Yamato 001140	Y-001140	Antarctica	2000	5.226	L6
Yamato 001141	Y-001141	Antarctica	2000	35.01	H3
Yamato 001142	Y-001142	Antarctica	2000	66.48	H4
Yamato 001144	Y-001144	Antarctica	2000	7.582	L5
Yamato 001146	Y-001146	Antarctica	2000	11.04	H4
Yamato 001148	Y-001148	Antarctica	2000	5.589	H4
Yamato 001152	Y-001152	Antarctica	2000	6.513	H4
Yamato 001153	Y-001153	Antarctica	2000	43.73	H4
Yamato 001155	Y-001155	Antarctica	2000	34.60	H6
Yamato 001160	Y-001160	Antarctica	2000	5.726	H5
Yamato 001161	Y-001161	Antarctica	2000	512.6	H4
Yamato 001162	Y-001162	Antarctica	2000	159.2	H5
Yamato 001163	Y-001163	Antarctica	2000	72.88	H5
Yamato 001164	Y-001164	Antarctica	2000	14.44	H5
Yamato 001166	Y-001166	Antarctica	2000	13.23	L6
Yamato 001168	Y-001168	Antarctica	2000	10.27	L6
Yamato 001169	Y-001169	Antarctica	2000	5.325	H5
Yamato 001170	Y-001170	Antarctica	2000	8.328	H6
Yamato 001171	Y-001171	Antarctica	2000	72.74	H4
Yamato 001172	Y-001172	Antarctica	2000	10.46	H6
Yamato 001173	Y-001173	Antarctica	2000	24.18	H6
Yamato 001174	Y-001174	Antarctica	2000	5.859	H5
Yamato 001175	Y-001175	Antarctica	2000	8.182	L6
Yamato 001177	Y-001177	Antarctica	2000	35.69	H4
Yamato 001178	Y-001178	Antarctica	2000	50.40	L6
Yamato 001179	Y-001179	Antarctica	2000	234.3	L6
Yamato 001180	Y-001180	Antarctica	2000	31.05	H5
Yamato 001181	Y-001181	Antarctica	2000	5.590	L6
Yamato 001182	Y-001182	Antarctica	2000	15.42	L6
Yamato 001183	Y-001183	Antarctica	2000	12.25	H5
Yamato 001184	Y-001184	Antarctica	2000	14.56	Diogenite
Yamato 001185	Y-001185	Antarctica	2000	96.48	H4
Yamato 001186	Y-001186	Antarctica	2000	25.83	H4
Yamato 001187	Y-001187	Antarctica	2000	88.48	H4
Yamato 001188	Y-001188	Antarctica	2000	39.76	H4
Yamato 001190	Y-001190	Antarctica	2000	6.334	H5
Yamato 001192	Y-001192	Antarctica	2000	8.005	H5
Yamato 001194	Y-001194	Antarctica	2000	328.0	H6
Yamato 001195	Y-001195	Antarctica	2000	19.88	H5
Yamato 001196	Y-001196	Antarctica	2000	9.111	H5
Yamato 001198	Y-001198	Antarctica	2000	16.28	H5
Yamato 001199	Y-001199	Antarctica	2000	32.87	H4
Yamato 001200	Y-001200	Antarctica	2000	23.39	H6
Yamato 001201	Y-001201	Antarctica	2000	87.39	L6

Yamato 001204	Y-001204	Antarctica	2000	68.79	H4
Yamato 001208	Y-001208	Antarctica	2000	5.940	H4
Yamato 001220	Y-001220	Antarctica	2000	5.349	H5
Yamato 001225	Y-001225	Antarctica	2000	15.69	H5
Yamato 001226	Y-001226	Antarctica	2000	11.95	H6
Yamato 001227	Y-001227	Antarctica	2000	8.402	Eucrite
Yamato 001229	Y-001229	Antarctica	2000	7.833	LL6
Yamato 001230	Y-001230	Antarctica	2000	10.61	L6
Yamato 001231	Y-001231	Antarctica	2000	45.07	H5
Yamato 001234	Y-001234	Antarctica	2000	11.85	L6
Yamato 001235	Y-001235	Antarctica	2000	43.95	L6
Yamato 001236	Y-001236	Antarctica	2000	106.2	L6
Yamato 001237	Y-001237	Antarctica	2000	377.4	L6
Yamato 001238	Y-001238	Antarctica	2000	23.48	L6
Yamato 001239	Y-001239	Antarctica	2000	35.78	L6
Yamato 001240	Y-001240	Antarctica	2000	97.64	L6
Yamato 001241	Y-001241	Antarctica	2000	60.22	Diogenite
Yamato 001242	Y-001242	Antarctica	2000	10.53	L4
Yamato 001243	Y-001243	Antarctica	2000	21.14	H5
Yamato 001246	Y-001246	Antarctica	2000	27.42	L6
Yamato 001248	Y-001248	Antarctica	2000	9.628	Eucrite-pmict
Yamato 001249	Y-001249	Antarctica	2000	5.442	L6
Yamato 001251	Y-001251	Antarctica	2000	8.895	H4
Yamato 001255	Y-001255	Antarctica	2000	20.27	H5
Yamato 001256	Y-001256	Antarctica	2000	5.262	LL6
Yamato 001257	Y-001257	Antarctica	2000	7.463	L5
Yamato 001259	Y-001259	Antarctica	2000	28.36	L6
Yamato 001260	Y-001260	Antarctica	2000	6.406	H3
Yamato 001261	Y-001261	Antarctica	2000	331.9	L6
Yamato 001262	Y-001262	Antarctica	2000	53.08	H5
Yamato 001263	Y-001263	Antarctica	2000	38.51	L5
Yamato 001264	Y-001264	Antarctica	2000	60.56	H5/6
Yamato 001265	Y-001265	Antarctica	2000	5.161	L6
Yamato 001266	Y-001266	Antarctica	2000	11.45	H3
Yamato 001269	Y-001269	Antarctica	2000	37.04	H5
Yamato 001271	Y-001271	Antarctica	2000	75.95	L5
Yamato 001272	Y-001272	Antarctica	2000	7.799	H5
Yamato 001273	Y-001273	Antarctica	2000	9.866	H5
Yamato 001275	Y-001275	Antarctica	2000	73.49	L6
Yamato 001276	Y-001276	Antarctica	2000	6.025	L6
Yamato 001277	Y-001277	Antarctica	2000	10.08	L6
Yamato 001278	Y-001278	Antarctica	2000	330.9	H6
Yamato 001279	Y-001279	Antarctica	2000	52.47	H6
Yamato 001280	Y-001280	Antarctica	2000	6.490	L3

Yamato 001282	Y-001282	Antarctica	2000	16.88	L4
Yamato 001283	Y-001283	Antarctica	2000	297.3	L3
Yamato 001284	Y-001284	Antarctica	2000	8.499	H5
Yamato 001285	Y-001285	Antarctica	2000	6.631	H4
Yamato 001286	Y-001286	Antarctica	2000	20.11	H5
Yamato 001287	Y-001287	Antarctica	2000	5.594	L6
Yamato 001289	Y-001289	Antarctica	2000	6.823	H5
Yamato 001290	Y-001290	Antarctica	2000	15.19	H5
Yamato 001294	Y-001294	Antarctica	2000	9.642	Diogenite
Yamato 001295	Y-001295	Antarctica	2000	17.38	L5
Yamato 001296	Y-001296	Antarctica	2000	40.97	L5
Yamato 001299	Y-001299	Antarctica	2000	15.19	H3
Yamato 001301	Y-001301	Antarctica	2000	5.272	H4
Yamato 001302	Y-001302	Antarctica	2000	5.541	H4
Yamato 001305	Y-001305	Antarctica	2000	12.94	R4
Yamato 001308	Y-001308	Antarctica	2000	8.801	H4
Yamato 001309	Y-001309	Antarctica	2000	6.053	L4
Yamato 001310	Y-001310	Antarctica	2000	7.944	H5
Yamato 001311	Y-001311	Antarctica	2000	36.62	L4
Yamato 001312	Y-001312	Antarctica	2000	15.55	H4
Yamato 001315	Y-001315	Antarctica	2000	6.453	H5
Yamato 001318	Y-001318	Antarctica	2000	44.37	H3
Yamato 001320	Y-001320	Antarctica	2000	6.526	H5
Yamato 001332	Y-001332	Antarctica	2000	6.603	Eucrite
Yamato 001333	Y-001333	Antarctica	2000	21.67	L6
Yamato 001334	Y-001334	Antarctica	2000	32.42	L6
Yamato 001335	Y-001335	Antarctica	2000	47.47	L6
Yamato 001351	Y-001351	Antarctica	2000	5.386	Eucrite
Yamato 001352	Y-001352	Antarctica	2000	106.7	H6
Yamato 001353	Y-001353	Antarctica	2000	17.71	H6
Yamato 001354	Y-001354	Antarctica	2000	103.5	H4
Yamato 001355	Y-001355	Antarctica	2000	98.81	L6
Yamato 001366	Y-001366	Antarctica	2000	36.95	Eucrite-pmict
Yamato 001368	Y-001368	Antarctica	2000	6.067	H5
Yamato 001379	Y-001379	Antarctica	2000	5.677	H4
Yamato 001380	Y-001380	Antarctica	2000	12.45	Howardite
Yamato 001382	Y-001382	Antarctica	2000	46.04	L3
Yamato 001383	Y-001383	Antarctica	2000	64.35	L3
Yamato 001388	Y-001388	Antarctica	2000	6.889	H4
Yamato 001389	Y-001389	Antarctica	2000	33.93	L6
Yamato 001399	Y-001399	Antarctica	2000	5.319	H4
Yamato 001405	Y-001405	Antarctica	2000	9.683	H5
Yamato 001406	Y-001406	Antarctica	2000	30.74	H5
Yamato 001409	Y-001409	Antarctica	2000	11.22	H5

Yamato 001410	Y-001410	Antarctica	2000	11.84	H5
Yamato 001415	Y-001415	Antarctica	2000	15.54	H5
Yamato 001422	Y-001422	Antarctica	2000	5.108	H5
Yamato 001430	Y-001430	Antarctica	2000	15.56	H5
Yamato 001431	Y-001431	Antarctica	2000	13.36	H5
Yamato 001434	Y-001434	Antarctica	2000	6.402	H5
Yamato 001440	Y-001440	Antarctica	2000	14.55	H5
Yamato 001441	Y-001441	Antarctica	2000	67.24	H5
Yamato 001450	Y-001450	Antarctica	2000	33.93	H5
Yamato 001453	Y-001453	Antarctica	2000	6.069	H5
Yamato 001456	Y-001456	Antarctica	2000	13.06	H5
Yamato 001458	Y-001458	Antarctica	2000	8.013	H5
Yamato 001459	Y-001459	Antarctica	2000	61.70	H5
Yamato 001461	Y-001461	Antarctica	2000	12.58	H4
Yamato 001468	Y-001468	Antarctica	2000	52.66	H3
Yamato 001470	Y-001470	Antarctica	2000	7.532	H5
Yamato 001471	Y-001471	Antarctica	2000	6.534	H5
Yamato 001472	Y-001472	Antarctica	2000	16.01	H5
Yamato 001476	Y-001476	Antarctica	2000	16.77	H4
Yamato 001481	Y-001481	Antarctica	2000	19.48	H4
Yamato 001487	Y-001487	Antarctica	2000	6.226	H4
Yamato 001488	Y-001488	Antarctica	2000	8.435	L6
Yamato 001489	Y-001489	Antarctica	2000	19.63	H5
Yamato 001490	Y-001490	Antarctica	2000	14.20	H5
Yamato 001502	Y-001502	Antarctica	2000	8.774	H5
Yamato 001509	Y-001509	Antarctica	2000	6.670	H5
Yamato 001510	Y-001510	Antarctica	2000	5.994	H5
Yamato 001511	Y-001511	Antarctica	2000	9.652	H5
Yamato 001512	Y-001512	Antarctica	2000	9.437	H5
Yamato 001513	Y-001513	Antarctica	2000	8.048	H5
Yamato 001516	Y-001516	Antarctica	2000	5.639	H5
Yamato 001517	Y-001517	Antarctica	2000	18.84	H5
Yamato 001518	Y-001518	Antarctica	2000	7.732	H5
Yamato 001538	Y-001538	Antarctica	2000	5.418	H5
Yamato 001539	Y-001539	Antarctica	2000	5.119	L5
Yamato 001540	Y-001540	Antarctica	2000	6.429	H4
Yamato 001544	Y-001544	Antarctica	2000	10.58	H4
Yamato 001545	Y-001545	Antarctica	2000	8.259	H5
Yamato 001546	Y-001546	Antarctica	2000	5.260	H5
Yamato 001548	Y-001548	Antarctica	2000	57.46	H5
Yamato 001550	Y-001550	Antarctica	2000	542.0	H4
Yamato 001551	Y-001551	Antarctica	2000	6.095	H4
Yamato 001558	Y-001558	Antarctica	2000	6.019	H5
Yamato 001576	Y-001576	Antarctica	2000	19.71	H5

Yamato 001577	Y-001577	Antarctica	2000	14.12	H5
Yamato 001578	Y-001578	Antarctica	2000	7.517	H5
Yamato 001584	Y-001584	Antarctica	2000	22.30	H5
Yamato 001585	Y-001585	Antarctica	2000	124.4	H5
Yamato 001590	Y-001590	Antarctica	2000	27.63	H5
Yamato 001593	Y-001593	Antarctica	2000	11.32	H5
Yamato 001594	Y-001594	Antarctica	2000	21.65	H6
Yamato 001595	Y-001595	Antarctica	2000	17.29	H5
Yamato 001597	Y-001597	Antarctica	2000	11.77	H4
Yamato 001600	Y-001600	Antarctica	2000	11.10	L6
Yamato 001602	Y-001602	Antarctica	2000	5.217	H5
Yamato 001603	Y-001603	Antarctica	2000	11.15	H5
Yamato 001605	Y-001605	Antarctica	2000	39.55	H5
Yamato 001644	Y-001644	Antarctica	2000	51.41	H6
Yamato 001646	Y-001646	Antarctica	2000	19.11	H5
Yamato 001647	Y-001647	Antarctica	2000	12.26	H5
Yamato 001648	Y-001648	Antarctica	2000	13.01	H5
Yamato 001656	Y-001656	Antarctica	2000	22.46	H5
Yamato 001658	Y-001658	Antarctica	2000	55.37	H5
Yamato 001666	Y-001666	Antarctica	2000	6.781	H5
Yamato 001677	Y-001677	Antarctica	2000	6.193	H5
Yamato 001678	Y-001678	Antarctica	2000	29.69	H4
Yamato 001681	Y-001681	Antarctica	2000	10.10	H4
Yamato 001682	Y-001682	Antarctica	2000	63.57	H4
Yamato 001688	Y-001688	Antarctica	2000	8.347	H4
Yamato 001692	Y-001692	Antarctica	2000	14.71	H4
Yamato 001693	Y-001693	Antarctica	2000	8.146	H4
Yamato 001694	Y-001694	Antarctica	2000	20.40	H6
Yamato 001695	Y-001695	Antarctica	2000	6.761	LL4
Yamato 001697	Y-001697	Antarctica	2000	6.200	H6
Yamato 001699	Y-001699	Antarctica	2000	12.08	H4
Yamato 001700	Y-001700	Antarctica	2000	20.49	H6
Yamato 001702	Y-001702	Antarctica	2000	47.71	H4
Yamato 001703	Y-001703	Antarctica	2000	19.75	H4
Yamato 001704	Y-001704	Antarctica	2000	11.82	H4
Yamato 001705	Y-001705	Antarctica	2000	26.77	H4-6
Yamato 001706	Y-001706	Antarctica	2000	24.44	H4-6
Yamato 001707	Y-001707	Antarctica	2000	16.23	H4
Yamato 001708	Y-001708	Antarctica	2000	11.35	H4
Yamato 001709	Y-001709	Antarctica	2000	11.25	L6
Yamato 001711	Y-001711	Antarctica	2000	118.9	H6
Yamato 001712	Y-001712	Antarctica	2000	11.78	H4
Yamato 001714	Y-001714	Antarctica	2000	7.421	H3
Yamato 001715	Y-001715	Antarctica	2000	19.39	H6

Yamato 001716	Y-001716	Antarctica	2000	11.55	L4
Yamato 001718	Y-001718	Antarctica	2000	5.640	H4
Yamato 001720	Y-001720	Antarctica	2000	17.02	H3
Yamato 001723	Y-001723	Antarctica	2000	10.45	H4
Yamato 001724	Y-001724	Antarctica	2000	9.546	H5
Yamato 001725	Y-001725	Antarctica	2000	8.406	L6
Yamato 001729	Y-001729	Antarctica	2000	67.63	H4
Yamato 001739	Y-001739	Antarctica	2000	15.97	L6
Yamato 001742	Y-001742	Antarctica	2000	6.459	H6
Yamato 001743	Y-001743	Antarctica	2000	35.08	H4
Yamato 001744	Y-001744	Antarctica	2000	6.121	H5
Yamato 001747	Y-001747	Antarctica	2000	78.96	L3
Yamato 001748	Y-001748	Antarctica	2000	203.2	H5
Yamato 001752	Y-001752	Antarctica	2000	443.7	H5
Yamato 001754	Y-001754	Antarctica	2000	16.52	H4
Yamato 001755	Y-001755	Antarctica	2000	5.370	H5
Yamato 001757	Y-001757	Antarctica	2000	9.047	H5
Yamato 001758	Y-001758	Antarctica	2000	13.75	H5
Yamato 001759	Y-001759	Antarctica	2000	6.202	L6
Yamato 001760	Y-001760	Antarctica	2000	8.785	L6
Yamato 001761	Y-001761	Antarctica	2000	7.006	L6
Yamato 001774	Y-001774	Antarctica	2000	8.518	H5
Yamato 001780	Y-001780	Antarctica	2000	5.484	H4
Yamato 001785	Y-001785	Antarctica	2000	12.40	H4
Yamato 001786	Y-001786	Antarctica	2000	5.492	H4
Yamato 001789	Y-001789	Antarctica	2000	9.388	H4
Yamato 001802	Y-001802	Antarctica	2000	8.235	H4
Yamato 001803	Y-001803	Antarctica	2000	8.449	H4
Yamato 001804	Y-001804	Antarctica	2000	8.939	H4
Yamato 001826	Y-001826	Antarctica	2000	5.973	H4
Yamato 001858	Y-001858	Antarctica	2000	8.369	H4
Yamato 001862	Y-001862	Antarctica	2000	7.084	H5
Yamato 001864	Y-001864	Antarctica	2000	11.16	H4-5
Yamato 001872	Y-001872	Antarctica	2000	33.91	H4
Yamato 001891	Y-001891	Antarctica	2000	5.045	H4
Yamato 001901	Y-001901	Antarctica	2000	6.927	H4
Yamato 001904	Y-001904	Antarctica	2000	14.67	H5
Yamato 001906	Y-001906	Antarctica	2000	13.74	H5
Yamato 001909	Y-001909	Antarctica	2000	22.14	H6
Yamato 001913	Y-001913	Antarctica	2000	26.46	H4
Yamato 001916	Y-001916	Antarctica	2000	7.588	L5
Yamato 001917	Y-001917	Antarctica	2000	31.31	H4
Yucca 015		United States	14 Nov 2011	3	H-metal
Yucca 016		United States	14 Nov 2011	25.9	H5

Yucca 017		United States	24 Nov 2011	>200	H5
Yucca 027		United States	11 Nov 2011	1.3	H-metal
Yucca 028		United States	2011 Nov 24	0.8	H6
Yucca 029		United States	2011 Dec 14	60.4	H3

5. Corrected entries

Name	abbrev	reason
Answer		Mass increased. MB54 neglected slice that was removed.
King Solomon		Mass noted in Houston (1971)
Lewis Cliff 87002	LEW 87002	Reclassification from AMN 36(2)
Northwest Africa 869	NWA 869	Revised classification and new description
Queen Alexandra Range 97002	QUE 97002	Reclassified in AMN 36(2)
Skiff		New information added
Tagish Lake		New specimen info added

6. Listing of institutions and collections

Aaronson:	Sahara Overland Ltd., Harhora, Temara, 12000, Morocco
ADebienne:	Rue de la Station 60, 6210 Reves, Belgium
AMSA:	Australian Museum, 6 College Street, Sydney, NSW 2010, Australia
App:	Department of Geology, 572 Rivers St., Appalachian State University, Boone, NC 28608, United States
ASU:	Center for Meteorite Studies, Arizona State University, Tempe, Arizona 85287-1404, United States
Bart:	Bartoschewitz Meteorite Laboratory, Lehmweg 53, D-38518 Gifhorn, Germany
BathO:	Bathurst Observatory Research Facility, 624 Limekilns Road, Kelso NSW 2795, Australia
Bern:	University of Bern, University of Bern, Hochschulstrasse 4, CH-3012 Bern, Switzerland
BGR:	Bundesanstalt für Geowissenschaften und Rohstoffe (BGR) Geozentrum Hannover Stilleweg 2 30655 Hannover, Germany
Boudreaux:	Terry Boudreaux, Illinois, United States
Cascadia:	Cascadia Meteorite Laboratory, Portland State University, Department of Geology, Room 17 Cramer Hall, 1721 SW Broadway, Portland, OR 97201, United States
CEREGE:	CEREGE BP 80 Avenue Philibert, Europole de l'Arbois 13545 Aix-en-Provence Cedex 4 France, France
Cilz:	Marlin Cilz, Montana Meteorite Lab, Box 1063, Malta, MT 59538, United States
CIW:	Carnegie Insitution Washington, Geophysical Laboratory, 5251 Broad Branch Rd., NW, Washington DC 20015, United States
Clary:	Ralph "Sonny" Clary, Las Vegas, NV 89131 , United States
CSIC-IGE:	Instituto de Geología Económica, CSIC-UCM, José Antonio Novais, 2, Facultad de Ciencias Geológicas, Universidad Complutense, 28040 Madrid, Spain

CSIR-NGRI:	Council of Scientific and Industrial Research, National Geophysical Research Institute, Uppal Road, Hyderabad-500606, Andhra Pradesh, India
CUG:	China University of Geosciences, Wuhan 430074, China
DMUH:	Dedovsk Museum of Universe History, Russia
DPitt:	Darryl Pitt, 225 West 83rd Street, New York, NY 10024, United States
EMTT:	Etudes Métallurgiques et de Traitement Thermique, Parc du Chater-Bât. B, 1, avenue du Chater, 69340 Francheville, France
Farmer:	Michael Farmer, P.O. Box 86059, Tucson, AZ 85754-6059, United States
FMNH:	Department of Geology The Field Museum of Natural History 1400 South Lake Shore Drive Chicago, IL 60605-2496, USA, United States
Franco:	Michel Franco (of Caillou Noir), 100 Chemin des Campenes 74400 Les Praz de Chamonix, France
FSAC:	Universite Hassan II Casablanca, Faculte des Sciences Ain Chock, Departement de Géologie, BP 5366 Maârif, Casablanca, Morocco
GHupé:	Gregory M. Hupé, 9003 Placid Lakes Blvd., Lake Placid, FL 33852, United States
GIG:	Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou 510640, China
GIGCAS:	Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, China
Gregory:	David Gregory, 230 First Avenue, Suite 108, St. Thomas, Ontario N5R 4P5, Canada
Gren:	Andreas Gren, Hamburg, Germany
GSI:	Geological Survey of India, 4 Chowringee Lane, Calcutta 700 016, India
GUT:	College of Earth Sciences, Guilin University of Technology, 12 Jiangan Road, Guilin 541004, China
Haag:	Robert Haag, P.O. Box 27527, Tucson, AZ 85726, United States
Haiderer:	Erich Haiderer Laboratory, P.O. Box 88, A-1140 Vienna, Austria
Hall:	No contact information provided., United States
Hmani:	A. Hmani Moroccan Imports, 13 rue Jules Hardouin Mansart, 92600 Asnières, France
HZM:	Helmholtz Zentrum Muenchen, Department of Environmental Sciences, Ingolstaedter Landstrasse 1, 85764 Neuherberg, Germany
Ibaraki:	Department of Materials and Biological Sciences, Institute of Astrophysics and Planetary Science, Ibaraki University, 2-1-1 Bunkyo, Mito 310-8512, Japan
IfP:	Institut für Planetologie, Wilhelm-Klemm-Str. 10, 48149 Münster, Germany
IGGCAS:	Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China
IGGCAS:	Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China
IGGCAS:	Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China
IGME:	Museo Geominero, Instituto Geológico y Minero de España, Ríos Rosas 23, 28003 Madrid, Spain
IPAG:	Institut de Planétologie et d'Astrophysique de Grenoble 414, Rue de la Piscine Domaine Universitaire 38400 St-Martin d'Hères , France

IPGP:	Institute de Physique du Globe de Paris, 1 rue Jussieu, 75252 Paris, Cedex 05, France
JAaronson:	Joe Aaronson, 8124 Blaikie Ct., Sarasota, FL 34240, United States
Jensen:	Jensen Meteorites, 16730 E Ada Pl., Aurora, CO 80017-3137, United States
JSC:	Mailcode KT, 2101 NASA Parkway, NASA Johnson Space Center, Houston, TX 77058, United States
JTobin:	The Meteorite Exchange, Inc., United States
JUtas:	Jason Utas, United States
Kiel:	Geologisches und Mineralogisches Museum, Institut für Geowissenschaften, Christian-Albrechts-Universität Kiel, Ludewig-Mayn-Str. 10, D-24118 Kiel, Germany, Germany
Kuntz:	Fabien Kuntz, France
Labenne:	23, rue de Esperance, 75013 Paris, France
MHNGE:	Muséum d'histoire naturelle, Route de Malagnou 1, CH-1211 Genève 6 , Switzerland
MKBraun:	Mineralien-Kabinett, Mineralogisch-petrographisches Museum, Technische Universität Braunschweig, Bienroderweg 95, 38106 Braunschweig, Germany, Germany
MMartin:	P.O. Box 164, Kaaawa, HI 96730, United States
MMC:	Museo del Meteorito, Tocopilla 401, San Pedro de Atacama, Chile. or Alonso de Ercilla 1250, La Herradura, Coquimbo, Chile, Chile
MNA-SI:	Museo Nazionale dell'Antartide, Università di Siena, Via Laterina 8, I-53100 Siena, Italy
MNB:	Museum für Naturkunde, Invalidenstrasse 43, D-10115 Berlin, Germany
MNHNP:	Museum National d'Histoire Naturelle, 61 Rue Buffon, LMCM-CP52, 75005 Paris, France, France
MNHNP:	Museum National d'Histoire Naturelle, 61 Rue Buffon, LMCM-CP52, 75005 Paris, France, France
Monash:	Building 28 School of Geosciences Monash University Victoria 3800 Australia, Australia
MPI:	Max-Planck-Institut für Chemie, Abteilung Kosmochemie, Postfach 3060, D-55020 Mainz, Germany
MSP:	Museo di Scienze Planetarie, Via Galcianese 20/H, 59100 Prato, Italy, Italy
MtMorgan:	Matt Morgan, Mile High Meteorites, P.O. Box 151293, Lakewood, CO 80215-9293, United States
NAU:	Geology, Bldg 12 Knoles Dr Northern Arizona University, Flagstaff, AZ 86011, United States
NHM:	Department of Mineralogy, The Natural History Museum, Cromwell Road, London SW7 5BD, United Kingdom
NHMV:	Naturhistorisches Museum, Burgring 7, 1010 Wien, Austria, Austria
NIPR:	Antarctic Meteorite Research Center, National Institute of Polar Research, 10-3 Midori-cho, Tachikawa, Tokyo 190-8518, Japan
NMBE:	Natural History Museum Bern Bernastrasse 15 CH-3005 Bern Switzerland, Switzerland
OAM:	Museo del Cielo e della Terra Vicolo Baciadonne 1 40017 San Giovanni in

	Persiceto (BO) Italy Osservatorio Astronomico e Museo "Giorgio Abetti", San Giovanni Persiceto, Bologna, Italy
OkaU:	Institute for Study of the Earth's Interior, Okayama University, Misasa Tottori 682-0193, Japan
Olsen:	Unknown person
OU:	Planetary and Space Sciences Department of Physical Sciences The Open University Walton Hall Milton Keynes MK7 6AA United Kingdom, United Kingdom
PMO:	Purple Mountain Observatory, Nanjing, China
PRIC:	Polar Research Institute of China, 451 Jinqiao Road, Shanghai 200129, China
PSF:	Planetary Studies Foundation,10 Winterwood Lane, Unit B, Galena, Illinois 61036-9283, United States
Ralew:	Stefan Ralew, Kunibertstraße 29, 12524 Berlin, Germany
RBINS:	Marleen De Ceukelaire Royal Belgian Institute of Natural Sciences, rue Vautier 29 - 1000 Brussels, Belgium
Reed:	Blaine Reed, P.O. Box 1141, Delta, CO 81416, United States
Rio:	Museu Nacional, Quinta da Boa Vista, Rio de Janeiro, CEP 20940-040, Brazil
ROM:	Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario M5S 2C6, Canada
RScherer:	R. Scherer, P.O. Box 92, Timber Lake, SD 57656, United States
SBuhl:	Meteorite Recon (Mr. S Buhl), Muehlendamm 86, 22087 Hamburg, Germany
SI:	Department of Mineral Sciences, NHB-119, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560, United States
SJS:	Space Jewels Switzerland, 2555 Brügg, Switzerland
SNGMC:	Servicio Nacional de Geología y Minería Av. Santa María 0104, Providencia, Chile
SNMB:	Staatliches Naturhistorisches Museum Braunschweig, Pockelsstraße 10 38106 Braunschweig , Germany
SQU:	Sultan Qaboos University, College of Science, Earth Sciences Department, P.O. Box 36 Code 123 AlKhoud, Oman
Stehlik:	Harald Stehlik, 1220 Wien, Austria
TCU:	Oscar E. Monnig Collection, Department of Geology, Texas Christian University, Ft. Worth, TX 76129, United States
Thompson:	Edwin Thompson, 5150 Dawn St., Lake Oswego, OR 97035, United States
Tobin:	J. Tobin, The Meteorite Exchange, PMB #455, P.O. Box 7000, Redondo Beach, CA 90277, United States
Twelker:	Eric Twelker, P.O. Box 844, Port Townsend, WA 98368, United States
UAb:	1-26 Earth Sciences Building, University of Alberta, Edmonton, AB, T6G 2E3, Canada, Canada
UCLA:	Institute of Geophysics and Planetary Physics, University of California, Los Angeles, CA 90095-1567, United States
UCSD:	Department of Chemistry and Biochemistry, University of California, San Diego, La Jolla, CA 92093, United States
UGött:	Georg-August-Universität Göttingen, Goldschmidtstr. 1, 37077 Göttingen, Germany

UHaw:	Hawai'i Institute of Geophysics and Planetology, School of Ocean and Earth Science and Technology, University of Hawai'i, 2525 Correa Road, Honolulu, HI 96822, United States
ULei:	University of Leicester, United Kingdom
UNM:	Institute of Meteoritics MSC03 2050 University of New Mexico Albuquerque NM 87131-1126 USA, United States
UPVI:	Université Pierre et Marie Curie (Paris VI),Case 110, 4 Place Jussieu, 75005 Paris, France
USP:	Darcy P. Svisero, Institute of Geosciences, University of Sao Paulo, Brazil
UTWroc:	Wroclaw University of Technology, Faculty of Geoengineering Mining and Geology, Institute of Minings, Wybrzeze Wyspianskiego 27, 50-370 Wroclaw, Poland
UWB:	University of Washington, Box 353010 Seattle, WA 98195, United States
UWO:	Department of Earth Sciences, University of Western Ontario, 1151 Richmond St., London, Ontario, Canada N6A 5B7, Canada
UWS:	University of Washington, Department of Earth and Space Sciences, 70 Johnson Hall, Seattle, WA 98195, United States
Verish:	Robert Verish, Meteorite-Recovery Lab, P.O. Box 463084, Escondido, CA 92046, United States
Vernad:	Vernadsky Institute of Geochemistry and Analytical Chemistry, Russia
Vienna:	University of Vienna, Dr-Karl-Lueger-Ring 1, A-1010 Wien, Austria
WAM:	Department of Earth & Planetary Sciences, Western Australian Museum. Locked Bag 49, Welshpool DC, Western Australia 6986, Australia
Ward:	No contact information provided.
Webb:	No contact information provided., United States
WrocU:	Wroclaw University, Institute of Geological Sciences, ul. Cybulskiego 30, 50-205 Wroclaw, Poland
WUC:	Dept. of Earth Sciences, Western University, 1151 Richmond St., London, ON, N6A5B7, Canada
WUSL:	Washington Univ., One Brookings Drive, St. Louis, MO 63130, United States

7. Acknowledgments

This Bulletin was prepared by the Meteorite Nomenclature Committee of the Meteoritical Society. Members for 2015 are Carl Agee (Chair), Chris Herd (Chair Emeritus), Audrey Bouvier (Meteoritical Bulletin Editor), Jeffrey Grossman (Meteoritical Bulletin Database Editor), Hasnaa Chennaoui Aoudjehane, Emma Bullock, Vinciane Debaille, Tasha Dunn, Jérôme Gattacceca, Trevor Ireland, Knut Metzler, Takashi Mikouchi, Alex Ruzicka, and Linda Welzenbach.