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Abstract–In this edition of *The Meteoritical Bulletin*, a total of 506 newly approved meteorite names with their relevant data are reported. These include 354 from northwest Africa, 31 from the Americas, 15 from Antarctica (Koreamet), 85 from Asia, 20 from Australia, and 1 from Europe. Among these meteorites are 2 falls, Grimsby (Canada) and Santa Lucia (2008) (Argentina). Also described are a CM with low degree of alteration, new ungrouped chondrites and achondrites, and 4 Martian meteorites.

INTRODUCTION

This issue of *The Meteoritical Bulletin* reports 506 new meteorite names that have been reviewed and approved by the Meteorite Nomenclature Committee. Meteorites and their relevant data are reported in tables according to location (Tables 1–7). Included in the tables are 354 meteorites from northwest Africa (Table 1), 9 from North America (Table 2), 22 from South America (Table 3), 15 from Antarctica (Table 4), 85 from Asia (Table 5), 20 from Australia (Table 6), and 1 from Europe (Table 7). The Antarctic meteorites in this edition of the bulletin were recovered by Korean Antarctic meteorite expeditions (Koreamet).

Reported in full written descriptions are 2 falls, Grimsby from Ontario, Canada, and Santa Lucia (2008) from Argentina. Also reported in written description are some of the less common or unusual new finds, e.g., Paris, a CM chondrite reported to have a low degree of alteration, found at an auction in Paris; Larned, an unusual aubrite; new ungrouped chondrites and achondrites; and 4 new Martian meteorites.

FALLS

THE AMERICAS

North America

Grimsby **43°12′N, 79°37′W**
Niagara region, southern Ontario, Canada
Fall: 01:03 UT 26 September 2009 [21:03 EDST September 25]
Ordinary chondrite (H5)

History: A brilliant fireball showing three major bursts was observed during the early evening of September 25, 2009 over southwestern Ontario. Automated cameras, radar, and infrasound sensors operated by *UWO* recorded the event, providing an orbit for the object and an accurate estimate of its fall location. Meteorites from the event fell in a 4 km by 8 km strewn field to the west and south of Grimsby, Ontario. One 46 g individual meteorite hit a parked vehicle and was recovered on the morning after the fall by A. Garchinsky. As of December 2009, 13 fragments had been found, totaling 215 g.

Physical characteristics: Of the 13 fragments, 11 have mature fusion crust and two have immature fusion crust representing a derivation from late fragmentation. Individual masses range from 1 to 69 g. Bulk properties (P. McCausland, *UWO*): Bulk density 3.37 ± 0.03 g/cm^3; grain density 3.62 ± 0.02 g/cm^3 (n = 6 fragments).

Petrography: (P. McCausland and R. Flemming, *UWO*): In situ micro-XRD of a fresh broken surface indicates the ubiquitous presence of low shock, about Fo90 olivine and enstatite, kamacite, and troilite as well as polycrystalline magnesioferrite spinel in the fusion crust. Polished thin sections show abundant chondrules and chondrule fragments ranging in size from 0.03 to 0.70 mm in apparent diameter. Matrix is variably recrystallized and chondrule rims are poorly defined, but feldspar is not well developed. Coarse olivines and pyroxenes show sharp optical extinction, implying a low shock state. Minor Fe-oxide has developed adjacent to some metal and troilite.

Geochemistry: *EPMA:* olivine ($Fa_{17.8 \pm 0.4}$, n = 8) and low Ca pyroxene ($Fs_{15.8 \pm 1.0}$, n = 5).

Classification: Ordinary chondrite (H5), S2, W0-1.

Type specimen: A 22 g sample and two polished thin sections are on deposit at *UWO*. Main mass held by *Farmer*.

South America

Santa Lucia (2008) **31°32′08″S, 68°29′22″W**

San Juan, Argentina

Fall: 23 January 2008, 17:20 hours daylight time (UT-3)

Ordinary chondrite (L6)

History: A fireball followed by a thunder-like sound was witnessed in the area at 17:20 hours local time. At Santa Lucia, a group of children felt an air wave before they found a black stone lying near their home. The stone was then picked up by them and 2 days later, it was brought to *CASLEO* Institute for investigation. Several pieces with more than 4 kg total mass have been recovered in the area of Santa Lucia.

Physical characteristics: The stone investigated at *CASLEO* is an individual piece weighing 1900 g and is totally covered by fusion crust. Its interior is light-gray with grains of fresh metal and sulfide.

Petrography (F. Brandstätter, *NHMV*, and M. E. Varela, *CASLEO*): Monomict breccia with strongly recrystallized texture. Only a few chondrules (mainly radial pyroxene) are visible. In places, twinned plagioclase is present. Most silicate grains are intensively fractured. Troilite occurs as polycrystalline grains.

Mineral compositions: EPMA: Olivine ($Fa_{24.4}$), pyroxene ($Fs_{20.7}$ $Wo_{1.5}$).

Magnetic susceptibility (Jérôme Gattacceca, *CEREGE*): Measurement of two fragments gave log χ = 4.65.

Classification: Ordinary chondrite (L6); weakly shocked; W0.

Type specimens: 20 g and one thin section are on deposit at *NHMV*. A mass of 1526 g is at the *La Plata Museum (La Plata, Argentina)* and 354 g is kept at *CASLEO*. A mass of 2230 g (several pieces) is held by an anonymous finder. Other pieces remain in the hands of local people.

FINDS

NORTHWEST AFRICA

Northwest Africa 3250

Northwest Africa

Find: 2005

Primitive achondrite (ungrouped)

Physical characteristics: (E. Haiderer, and R. Bartoschewitz): One olive green stone of 916 g covered by about 20% of black fusion crust was found in 2005 and sold at a mineral show in Germany. Magnetic susceptibility logχ = 4.74 × 10^{-9} m^3/kg.

Petrography (R. Bartoschewitz): Fine- to medium-grained unbrecciated rock (0.05–1 mm) with primarily protogranular texture composed of (in vol%) olivine (58%), low-Ca pyroxene (38%), and accessory plagioclase (1%), taenite (2%), troilite (1%), and chromite (<1%). Metal inclusions do not show any rust halos.

Geochemistry (R. Bartoschewitz, P. Appel/B. Mader *Kiel*, E. Haiderer, J. Atard, *La Valetta*): Olivine $Fa_{37.4–38.1}$, Fe/Mn 87 (atomic); low-Ca pyroxenes $Fs_{29.6–30.6}$, $Wo_{3.2–2.8}$, Fe/Mn 56 (atomic); plagioclase $An_{46.4–49.4}Or_{1.1–1.5}$. Taenite Ni 17.6–21.2, Co 1.0–1.2; chromite TiO_2 1.3–1.5, Al_2O_3 13.3–13.5, MgO 3.0–3.4 (all wt%). O-isotopes (*I. A. Franchi* and *R. C. Greenwood, OU*): $\delta^{17}O$ = −0.03, $\delta^{18}O$ = 3.25, $\Delta^{17}O$ = −1.72.

Classification: (R. Bartoschewitz and E. Haiderer): Primitive achondrite (ungrouped).

Specimens: A total of 20 g is on deposit at *Kiel*, *Bart* holds 9.7 g and one thin section, *Haiderer* (Erich Haiderer, P.O. Box 88, A-1193 Vienna, Austria) holds the main mass.

Northwest Africa 4901

Purchased 2007 in Erfoud, Morocco

Achondrite (ungrouped basalt)

History: The meteorite was found by an anonymous finder in northwest Africa and bought by the main mass holder in Erfoud, Morocco.

Physical characteristics: One brownish 24 g fragment was found.

Petrography (A. Greshake, *MNB*)**:** The meteorite displays an unbrecciated texture dominated by coarse-grained pyroxene and small, recrystallized plagioclase. Pyroxene is Ca-rich and shows abundant exsolution lamellae. Minor phases include silica, Ca-phosphates, ilmenite, and Ti-rich chromite.

Geochemistry: Mineral composition (EPMA): plagioclase, $An_{79–87}$; pyroxene, $Fs_{34.4–62.5}Wo_{6.5–39.7}$; the Fe/Mn ratio of pyroxene is approximately 70.

Classification: Achondrite (ungrouped basalt); low degree of shock, low degree of weathering; pairing of the meteorite with NWA 011, 2400, 2976, 4587, and others in this pairing group seems likely.

Specimens: A total of 4.9 g plus one polished thin section are on deposit at *MNB*. Stefan Ralew, Kunibertstrasse 29, 12524 Berlin, Germany holds the main mass.

Northwest Africa 5402

Algeria

Find: December 2005

Ordinary chondrite (LL6, porous impact melt)

History: Purchased by Greg Hupé in June 2008 from a Moroccan dealer in Rissani.

Physical characteristics: A single 189 g light gray stone with prominent small cavities exhibiting internal planar crystal faces.

Petrography (A. Irving and S. Kuehner, *UWS*): Grain size 0.1 to 0.4 mm, with an overall igneous texture. Prismatic grains of olivine and zoned low-Ca pyroxene are surrounded by interstitial or intercumulus plagioclase (or plagioclase glass), with accessory chromite, taenite, and troilite. Rare relict chondrules are observed. Areas with plagioclase compositions commonly exhibit triangular shapes in two dimensions, and have marginal inclusions of skeletal pyroxene (which appear to have grown from interstitial melt before plagioclase crystallized). Cavities are present within the interior of specimen as well as on the exterior, and do not appear to be plucked feldspar or other minerals, as their walls consist of euhedral to subhedral crystal faces of surrounding olivine and pyroxene grains without adhering plagioclase (Fig. 1).

Geochemistry: Olivine ($Fa_{28.8–30.5}$, FeO/MnO = 54.3–63.3), low-Ca pyroxene ($Fs_{24.8}Wo_{4.0}$, FeO/MnO = 36.7), pigeonite ($Fs_{23.7–24.5}Wo_{7.9–9.7}$, FeO/MnO = 32.3–33.6), plagioclase ($An_{9.1–13.9}Or_{3.1–1.8}$).

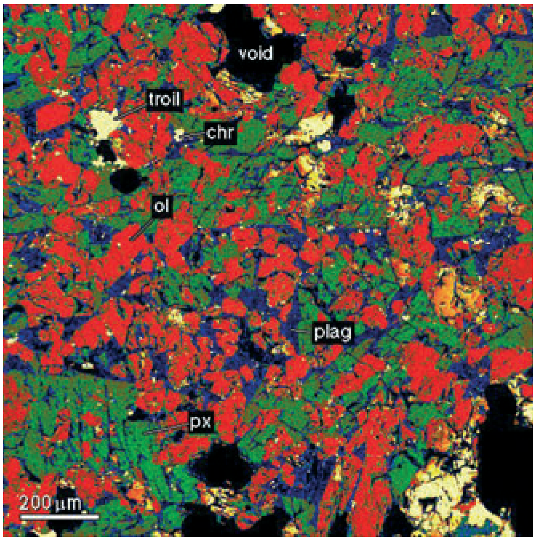

Fig. 1. False-colored BSE image of NWA 5402 showing its texture and voids. Ol = olivine; Px = pyroxene; plag = plagioclase; chr = chromite; troil = troilite.

Fig. 2. Cut surface of NWA 5717 (7.0 × 6.6 cm). Dark areas are lithology A, light areas are lithology B.

Classification: Ordinary chondrite (LL6, S5, W1). This specimen appears to be the product of almost complete melting of an LL chondrite precursor followed by crystallization, but is unusual because of the preservation of apparently primary cavities (Fig. 2).

Specimens: A total of 20.3 g of sample and one polished thin section are on deposit at *UWS*. Mr. G. M. *Hupé* holds the main mass.

Northwest Africa 5717

Western Sahara

Find: 2008

Chondrite (ungrouped, 3.05 subtype)

History and physical characteristics: In late 2006, just NW of Mahbas, Western Sahara, a single fresh stone was recovered that weighed 7.310 kg. Blanketed in fusion crust and showing only the slight spots of oxidation, there is one small fractured face where fusion crust is absent and the internal structure is visible. The specimen was acquired by a Moroccan meteorite and fossil dealer in Erfoud in late 2008, from whom it was purchased by Darryl Pitt in December of the same year.

Petrography (T. Bunch and J. Wittke, *NAU*; A. Irving *UWS*): An assemblage of two unique chondrule lithologies (Fig. 2). Lithology A, the apparent host, consists of dark, tightly packed chondrules within a sparse, cataclastic matrix composed of abraded chondrule rim material (matrix = 8 vol%). Many chondrules have a thin rim of metal, sulfide, and fine-grained silicates. Chondrules are typically sub-round to sub-angular and range in size from 0.04 to 4.1 mm, mean = 0.455 mm. Matrix = 8 vol% and metal, sulfides, and metal oxides = 4 vol%. Lithology B occurs as lumpy to swirling arrays of white to gray Mg-rich chondrules that range in size from 0.05 to 3.6 mm together with a prominent subset of microchondrules (5 vol%) 0.012 to 0.050 mm in diameter. A few large (4 to 8.4 mm), irregular-shaped chondrule-like objects are present and consist mostly of enstatite. Strong compositional zoning is common in chondrule olivine and pyroxene, which are set in a mesostasis of clear, optically isotropic glass and quench crystals. Metal and sulfides occur as sub-rounded aggregates in the matrix (6 vol%).

Geochemistry: Lithology A: Olivine cores, $Fa_{9.7–20.8}$ (FeO/MnO mean = 40); rims, $Fa_{16.2–35.6}$ (FeO/MnO mean = 36), ferroan olivine Cr_2O_3 = 0.23–0. 91 wt%, mean = 0.53. Lithology B: Olivine cores, $Fa_{0.03–3.4}$; Cr_2O_3 in olivine, 0.24 – 0.84 wt%, mean = 61. Olivine rims, $Fa_{17.2–27.5}$; Cr_2O_3 mean = 0.28 wt%. Ferroan olivine (Fa > 8) Cr_2O_3 = 0.28–0.78, mean = 0.47 wt%. Chondrule enstatite is Fa $_{0.04–5.8}$Wo $_{0.7}$. Average composition of mesostasis glass is (in wt%, *N* = 6): Na_2O = 4.65; MgO = 1.45; Al_2O_3 = 12.8; SiO_2, 71.3; P2O5 = 0.45; K_2O = 1.23; CaO = 1.38; TiO_2 = 0.47; Cr_2O_3 = 0.04 and FeO = 5.7. *Oxygen isotopes* (D. Rumble, *CIW*): Analyses of two acid-washed whole rock samples by laser fluorination gave, respectively: lithology A, $\delta^{18}O$ = 4.17 and 4.47; $\delta^{17}O$ = 2.73 and 2.90; $\Delta^{17}O$ = 0.539 and 0.554 (all ‰); lithology B, $\delta^{18}O$ = 3.15 and 3.68; $\delta^{17}O$ = 1.72 and 2.01; $\Delta^{17}O$ = 0.061 and 0.080.

Classification: Chondrite (ungrouped, type 3.05). Although the oxygen isotopic compositions for lithology A are similar to those of H chondrites, the very low metal content together with other characteristics are inconsistent with an H classification. Lithology B oxygen isotopic compositions are dissimilar from those of all other meteorites. The $\Delta^{17}O$ values of lithology B are close to those of most enstatite-rich meteorites, but the mafic minerals are significantly more ferroan. Olivine Fa range and Cr_2O_3 contents of both lithologies are consistent with type 3.05. The weathering grade is W1/2 and the shock level is S2.

Type specimen: A total of 40 g of material and one thin section are on deposit at *NAU*. *D. Pitt* holds the main mass.

Fig. 3. Cut surface of NWA 5782 showing its brecciated texture. Units on scale (rule) are inches.

Northwest Africa 5782

Morocco
Purchased: September 2008
Achondrite (acapulcoite/lodranite)

History and physical characteristics: Purchased by Blaine Reed at the Denver Mineral Show. Two pieces with a total mass of 130 g were found in a batch of meteorites. The stones experienced moderate terrestrial weathering, but some fusion crust is still visible.

Petrography (T. Bunch and J. Wittke, *NAU*; A. Irving, *UWS*; P. Sipiera, *PSF*): A polymict breccia of subrounded to subangular clasts (exhibiting some preferred orientation) set in a cataclastic matrix with minor glass and secondary Fe hydroxide veinlets (Fig. 3). The most abundant clasts (45 vol%) are recrystallized acapulcoites with polygonal texture (mean grain size is 0.225 mm). Coarser grained, protogranular to polygonal textured clasts (25 vol%) are various types of lodranites (mean grain size is 0.745). The matrix (30 vol%) contains debris from both types of lithology, and additionally rare, small xenolithic fragments of augite with exsolution lamellae of Ca-poor pyroxene.

Mineral compositions and geochemistry: *Acapulcoites* Olivine $Fa_{8.7–13.3}$ (FeO/MnO = 17–27); low-Ca pyroxene $Fs_{9.0–4.1}$, $Wo_{2.1–3.0}$; clinopyroxene $Fs_{4.8–7.5}$, $Wo_{45.7–47.9}$. *Lodranites* Olivine $Fa_{8.6–13.7}$ (FeO/MnO =

16–18); low-Ca pyroxene $Fs_{12.7–13.7}$, $Wo_{2.8}$; clinopyroxene $Fs_{4.6}$, $Wo_{46.7}$ (Al_2O_3 1.10 wt%, Cr_2O_3 1.83 wt%, TiO_2 0.63 wt%). Xenolithic fragment clinopyroxene $Fs_{19.5}$, $Wo_{42.8}$ (FeO/MnO = 24); orthopyroxene $Fs_{40.7}Wo_{4.1}$ (FeO/MnO = 32). *Oxygen isotopes* (D. Rumble, *CIW*): acid-washed material analyzed in duplicate by laser fluorination gave, respectively $\delta^{17}O$ = 0.53, 0.66; $\delta^{18}O$ = 3.24, 3.03; $\Delta^{17}O$ = −1.172, −0.936 per mil.

Classification: Achondrite (acapulcoite, anomalous). This specimen is unusual among acapulcoites in that it is a breccia and contains a significant component of lodranite clasts.

Type specimens: A total of 20.8 g of material and one polished thin section are on deposit at *FMNH* in the PSF collection; another thin section is on deposit at *NAU*. The main mass is held by B. Reed.

Northwest Africa 5789

Morocco

Find (found January 2009, purchased May 2009)

Achondrite (Martian, olivine-phyric shergottite)

History: A small chip from one of three crusted stones found together in Morocco was sent from a dealer in Erfoud to Greg Hupé, and subjected to preliminary testing at *UWS*. Subsequently the stones were purchased in May 2009 by Stefan Ralew and Martin Altmann.

Physical characteristics: A 49 g partly crusted stone, naturally broken into three pieces that fit together (Fig. 4a). The interior consists mainly of pale yellow-green olivine macrocrysts in a light brownish-gray, finer-grained matrix (Fig. 4b). No maskelynite is evident. Several exterior sides are coated by glossy black fusion crust, which contains embedded rounded quartz grains.

Petrography (A. Irving and S. Kuehner, *UWS*; J. Gross, A. Treiman, K. Robinson, *LPI*) Small (up to 1 mm), zoned olivine macrocrysts (in multi-crystalline clusters) with narrow ferroan rims are set in a finer grained groundmass composed mainly of prismatic low-Ca pyroxene grains with accessory olivine, chromite, pyrrhotite, and small regions of mesostasis (approximately 2 vol%) composed of subparallel, laminar to sheaf-like intergrowths of pigeonite, intermediate plagioclase, silica, ilmenite, and merrillite. The pyroxenes exhibit chaotic compositional zoning, with low-Ca pyroxene cores, regions of pigeonite and augite, and narrow ferropigeonite rims.

Geochemistry: Olivine macrocrysts (cores $Fa_{15.6–16.6}$, FeO/MnO = 45.2–49.4; mantle $Fa_{22.6}$, FeO/MnO = 47.6; rim $Fa_{45.4}$, FeO/MnO = 58.9), matrix olivine ($Fa_{47.3}$, FeO/MnO = 61.1), low-Ca pyroxene (cores as magnesian as $Fs_{17.1}Wo_{1.6}$, FeO/MnO = 30.9), pigeonite ($Fs_{25.6}Wo_{9.8}$, FeO/MnO = 31.3), augite ($Fs_{25.3}Wo_{25.0}$, FeO/MnO = 26.8), ferropigeonite rims as ferroan as $Fs_{78.9}Wo_{16.5}$, FeO/MnO = 39.6), plagioclase ($An_{58.3–64.4}Or_{0.8–0.6}$). *Oxygen isotopes* (D. Rumble, *CIW*): acid-washed material analyzed by laser fluorination gave, respectively $\delta^{18}O$ = 4.60, 4.52; $\delta^{17}O$ = 2.64, 2.66; $\Delta^{17}O$ = 0.216, 0.278 per mil. *Bulk composition* (M. Gellissen, *U. Bochum*; C. Herd, *UAb*; R. Korotev, *WUSL*): XRF analysis of bulk powder gave (in wt%) SiO_2 48.6, TiO_2 0.45, Al_2O_3 5.3, Cr_2O_3 0.73, FeO 17.6, MnO 0.45, MgO 19.2, CaO 6.5, P_2O_5 0.34; measurements by ICP-MS and INAA of the same powder gave 0.69 wt% Na_2O and (in ppm) La 0.15, Nd 0.65, Sm 0.51, Eu 0.27, Gd 1.18, Dy 1.81, Yb 1.06, Lu 0.15.

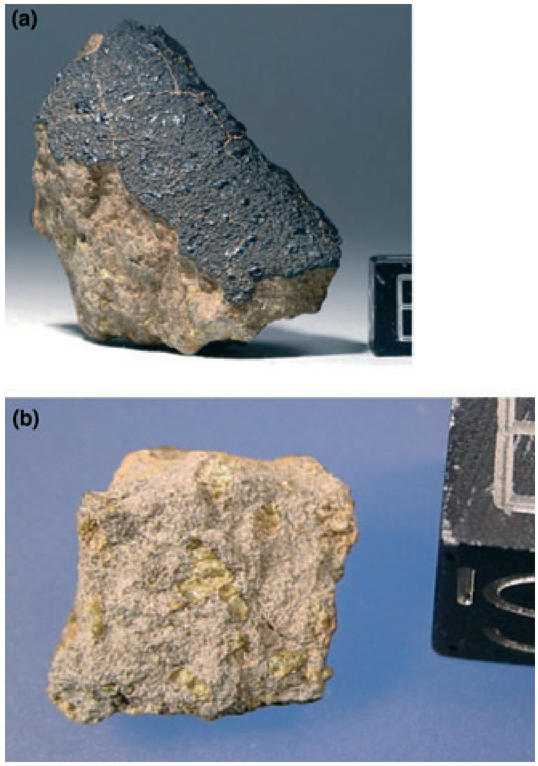

Fig. 4. a) A 29.7 g crusted piece of NWA 5789. b) A 1.8 g fragment showing large olivine grains. Cube for scale is 1 cm.

Classification: Achondrite (Martian, olivine-phyric shergottite). This specimen has mineralogical and bulk compositional similarities to Yamato-980459/980497, but differs from those stones in having very little mesostasis.

Specimens: A total of 9.8 g, two polished thin sections and a polished mount are on deposit at *UWS*; a further 5.6 g of material is held by A. Treiman (*LPI*) and another 3.3 g at *UAb*. The remaining material is held by anonymous collectors and institutions.

Northwest Africa 5790
Northwest Africa
Find: Spring 2009
Martian (nakhlite)

History: Found in the desert by nomads and purchased by A. Habibi in Erfoud (Morocco).

Physical characteristics: Two stones totaling 145 g, with millimeter-sized phenocrysts in a groundmass with pinkish luster. Very friable.

Petrography (A. Jambon, O. Boudouma, D. Badia, *UPVI*): Millimeter-sized euhedral dominant augite with sharp rim zoning and faint irregular zoning inside. Subsidiary euhedral olivine phenocrysts of similar size, zoned to their core. Interstitial mesostasis contains dendritic oxides pyroxene, feldspar, silica, phosphate, and glass. Minor Cl-amphiboles in trapped melt inclusions. Mode (vol%) from back scatterd electron images: Augite 51.2, olivine 9.1, mesostasis 39.7, titanomagnetite < 1%.

Mineral compositions (SEM and EMPA; A. Jambon, O. Boudouma, D. Badia, *UPVI*) **and geochemistry** (ICP-MS; J-A Barrat *UBO*): Zoned augite core (En_{35}, Fs_{24}, Wo_{40}, and Fe/Mn = 32) sharp rim (En_{20}, Fs_{43}, Wo_{36}, and Fe/Mn = 42), olivine progressively zoned from the core (Fa65 with Fe/Mn = 47) to the rim (Fa80 with Fe/Mn = 40). Rare Ti-magnetite phenocrysts $Uv_{32}Mt_{56}Sp_7Ct_4$ with fine ilmenite exsolutions. In the mesostasis dendritic crystals of Ti-magnetite: $Uv_{52–74}$ $Mt_{38–19}$, acicular pyroxene ($En_{7,}Fs_{47}Wo_{46}$ and Fe/Mn = 55), and olivine Fa88. Plagioclase $An_{16}Ab_{79}Or_5$. Augite with 2–3wt% Cl.

Bulk major-element chemistry similar to other nakhlites; element ratios confirm Martian origin (K/La = 473, Ga/Al = 3.7 10^4); significantly higher proportion of mesostasis than other nakhlites with the highest Th, U, and rare earth elements (REE) concentrations reported for a nakhlite (e.g., Th = 0.85 ppm); REE pattern characterized by a strong light REE enrichment $(La/Yb)_n$ = 5.8, and Eu/Eu* = 0.86.

Oxygen isotopes (R. Greenwood and I. Franchi, *OU*): $\Delta^{17}O$ = 0.30‰.

Type specimens: A mass of 16 g, is on deposit at *UPVI;* 2.77 g *UAb*; 1.25g *UWS*; main mass, *Habibi*.

Northwest Africa 5960
Mali
Find: August 2009
Achondrite (Martian, olivine-phyric shergottite)

History: A pale colored stone found near Guirat Laghnam in northern Mali in August 2009 was purchased by Ali and Mohammed Hmani.

Physical characteristics: A very fine-grained, partly fusion-crusted stone (147 g) displaying fluted abrasion features on several sides. The fresh interior is pale gray with evenly-distributed, larger, pale tan grains.

Petrography (A. Irving and S. Kuehner, *UWS*): Porphyritic texture, with small (0.15 to 0.35 mm) olivine phenocrysts in a finer grained groundmass composed mainly of prismatic pigeonite and maskelynite with accessory olivine, chromite, titanomagnetite, ilmenite, merrillite, and pyrrhotite.

Geochemistry: Olivine (core $Fa_{25.4}$, rim $Fa_{39.2}$; FeO/MnO = 47.0–52.1), pigeonite ($Fs_{31.2–38.7}Wo_{5.1–12.5}$, FeO/MnO = 26.2–31.3), plagioclase ($An_{55.9–56.6}Or_{2.1–1.8}$).

Classification: Achondrite (Martian, olivine-phyric shergottite). This specimen has essentially the same external appearance, grainsize, texture, and mineral compositions as NWA 2990, and may be paired with it.

Specimens: A 20.0 g type specimen and one polished thin section are on deposit at *UWS*. The remaining material is held by an anonymous collector.

Northwest Africa 5990
Morocco
Find (found July 2009, purchased September 2009)
Achondrite (Martian, shergottite)

History: A small stone was found on Hamada du Drâa, Morocco and purchased by Stefan Ralew and Martin Altmann.

Physical characteristics: A single 59 g stone coated on one side by fusion crust showing linear ablation lines. The interior is black, beige, and white with the overall appearance of a terrestrial diabase (Fig. 5).

Petrography (A. Irving and S. Kuehner, *UWS*): Medium-grained (up to 1.1 mm) with a subophitic texture, and composed of pyroxene (mostly pigeonite with some subcalcic augite, 35 vol%), plagioclase (35 vol%), and olivine (25 vol%) with accessory chromite, ilmenite, pyrrhotite, Na-Mg-bearing merrillite, and rare magnetite. Shocked plagioclase is in part maskelynite, and in part spherulitic aggregates of birefringent plagioclase blades containing vesicles. None of the minerals exhibit much compositional zoning.

Geochemistry: Olivine (core $Fa_{40.7}$, rim $Fa_{46.9}$, FeO/MnO = 52.0–53.5), pigeonite ($Fs_{28.3}Wo_{7.8}$ to $Fs_{33.1}Wo_{12.5}$, FeO/MnO = 27.6–30.0), clinopyroxene ($Fs_{19.9}Wo_{29.9}$, FeO/MnO = 24.1), plagioclase ($An_{64.3–65.2}Or_{0.2–0.1}$). *Oxygen isotopes* (D. Rumble, *CIW*): acid-washed material analyzed by laser fluorination gave, respectively $\delta^{18}O$ = 4.15, 4.21; $\delta^{17}O$ = 2.41, 2.47; $\Delta^{17}O$ = 0.226, 0.253 per mil.

Classification: Achondrite (Martian, shergottite). This specimen is unlike other shergottites in being coarser grained than most (diabasic), and in containing significant amounts of olivine that is not phenocrystic.

Fig. 5. Polished face of cut slice of NWA 5990. Scale cube is 1 cm.

Specimens: A total of 11.8 g of type material, two polished thin sections and a polished mount are on deposit at *UWS*. The remaining material is held by anonymous collectors and institutions.

THE AMERICAS

North America

Larned **38°11.97′N, 99°9.72′W**
Kansas
Find: 1977
Achondrite (aubrite, anomalous)

History: Found by an anonymous landowner on his farm in 1977, about 1 mile north and 4 miles west of Larned, Kansas. The mass was brought to the Big Well in Greensburg, Kansas in April 2007 and purchased by Dr. Donald Stimpson.

Physical characteristics: A single mass weighing 28.1 kg surrounded by grayish to brownish, shaley weathering rind. The interior is mostly gray with metal visible in places, and it is transected by anastomosing, thin, dark brown veinlets.

Petrography (A. Irving and S. Kuehner, *UWS*; T. Bunch and J. Wittke, *NAU*): Polymict breccia composed mostly of large metal-poor clasts, but with locally abundant metal in the matrix. The major phase is near-pure enstatite (up to 1.2 cm, many exhibiting abundant fractures, mosaicism, and planar deformation features), with accessory diopside, schreibersite, sodic plagioclase glass, silica, Cr-bearing troilite, daubreelite, niningerite, Si-bearing kamacite, and rare taenite. One 1.4 × 1.0 mm clast is a websterite composed of 52 vol% enstatite, 40 vol% diopside, and 8 vol% schreibersite and sulfides (including an iron sulfide phase compositionally similar to greigite). Silica exhibits ballen structures and occurs as inclusions in enstatite and is locally abundant in the matrix. Secondary veinlets are composed of a hydrous iron silicate compositionally similar to greenalite.

Geochemistry: Enstatite ($Fs_{0.1–0.2}Wo_{0.4–1.1}$), diopside ($Fs_{0.2}Wo_{47}$), plagioclase glass ($\sim Ab_{79}Or_{21}$), kamacite (Si 1.35–2.2 wt%, Ni 5.9–6.6 wt%), taenite (Si 1.1 wt%, Ni 12.6 wt%).

Classification: Achondrite (aubrite, anomalous). This large specimen contains more metal and more silica polymorph than most aubrites, and has experienced a high degree of shock (producing fractured enstatite, ballen silica and feldspathic glass).

Specimens: A total of 190 g of sample and two polished thin sections are on deposit at *UWS*. The main mass is held by *Dr. D. Stimpson* (Donald Stimpson, Kansas Museum and Nature Center, 21255 K Street, Haviland, KS 67059).

ANTARCTICA

Table 4 reports meteorites recovered by Korean Antarctic meteorite expeditions.

ASIA

Oman

Jiddat al Harasis 479 **19°47.139′N 55°51.21′E**
Oman
Find: 2008
Basaltic shergottite

History: This meteorite was found in the desert of Oman.

Physical characteristics: One individual greenish-gray stone weighing 553 g, incompletely covered with black fusion crust.

Petrography (M.A. Ivanova, C.A. Lorenz, *Vernad*): The meteorite is a coarse-grained rock of subophitic texture. It is composed of anhedral pigeonite and subhedral, elongated augite grains 1–2 mm in size, and isotropic feldspar lathes 40–60 mm wide and up to 1.5 mm long, between pyroxene gains. Minor phases are olivine, ilmenite, silica, orthoclase, apatite, whitlockite, zircon, pyrrhotite, and troilite. The fine-grained aggregates of clinopyroxene, olivine, and silica occur on the outer parts of pyroxene grains.

Geochemistry (EPMA, N.N. Kononkova, *Vernad*): Pyroxenes are zoned, pigeonite $En_{2.0–40.6}Wo_{12.0–19.9}$ (Fe/Mn = 41 at., Mg/(Mg + Fe) = 0.02–0.50 at.); augite $En_{14.7–46.0}Wo_{20.4–31.4}$ (Fe/Mn = 28 at., Mg/(Mg + Fe) = 0.19–0.64 atom%), olivine $Fo_{3.8}$ (Fe/Mn = 54.4 at.). Feldspar is non-stoichiometric maskelynite and varies in composition: $An_{76}Ab_{18}Or_6$–$An_{66}Ab_{31}Or_3$.

Concentrations of REEs (INAA, *Vernad*, ppm): La 1.4, Ce 3.36, Nd 2.18, Sm 0.77, Eu 0.24, Tb 0.21, Yb 1.27, Lu 0.25.

Oxygen isotopic composition (I.A. Franchi *OU*): $\delta^{17}O$ = 2.951 ‰, $\delta^{18}O$ = 5.070 ‰, $\Delta^{17}O$ = 0.315‰.
Classification: Basaltic shergottite.
Specimens: A total of 25.7 g and one thin section are on deposit at *Vernad*. An anonymous finder holds the main mass.

AUSTRALIA

Table 6 lists all approved meteorite names and relevant data from Australia.

EUROPE

Paris
Unknown location
Find: 2001
Carbonaceous chondrite (CM)
History: This sample was in an auction box lot bought by Jean-Jacques Corré at the Hotel des Ventes in Paris. The box was part of the estate of Jean Simon Colonna-Cimera, an "Ingénieur des Mines," who supervised mines in foreign countries and in the French Colonies. Corré thought that the stone might be a meteorite but kept it for 7 years before attempting to have it identified.
Physical characteristics: One complete, fresh stone weighing 1.370 kg and covered with a very black fusion crust (Fig. 6).
Petrography (M. Bourot-Denise, B. Zanda, *MNHNP*): The stone contains abundant metal and refractory inclusions up to 800 μm in size. The chondrules (up to 1 mm in size) are well preserved, although their mesostases are altered to phyllosilicates. The fine-grained matrix is heterogeneous and contains zones with abundant sulfides (pyrrhotite and pentlandite), zones with magnetites, and zones with PCPs.
Mineral compositions and geochemistry: Olivine ($Fa_{0.2-55}$, CaO = 0.35, Cr_2O_3 = 0.35); low-Ca pyroxene ($Fs_{0.6-4.4}$). Minor phases: kamacite (average: Ni = 5.5, Co = 0.22), tochilinite, pyrrhotite, pentlandite, magnetite (pure Fe_3O_4); calcite and PCPs (average: FeO = 52, SiO_2 = 12, S = 9). (EPMA and expressed in wt%). *Oxygen isotopes*: $\delta^{18}O$ = 3.34 ‰, $\delta^{17}O$ = −1.37 ‰.
Classification: Carbonaceous chondrite (CM), no signs of terrestrial weathering or shock (chondrules are perfectly spherical). Chondrules are more abundant and phyllosilicates less abundant than in CM2s. PCP averages 4.51 for FeO/SiO_2 and 0.77 for S/SiO_2, well out of the ranges defined by Rubin et al. (2007), making Paris significantly less aqueously altered than any known CM2. Oxygen isotopes also place it toward the least hydrated end of CM chondrites.

Fig. 6. The Paris CM chondrite showing fresh fusion crust and interior.

Type specimens: The mass of 1.275 kg and one thin section are on deposit at *MNHNP*.

ERRATA

Errata to previous editions of *The Meteoritical Bulletin*.
The Meteoritical Bulletin 89
NWA 3134 might be paired with NWA 3102, not with NWA 310.
The Meteoritical Bulletin 91
For United Arab Emirates 001, the correct name of the finder is Heiko Kallweit.
The Meteoritical Bulletin 91
Correct coordinates:
JaH 335—19°37.423′ 55°43.695′
JaH 336—19°54.159′ 55°39.323′
JaH 337—20°0.293′ 55°42.916′
JaH 339—19°55.731′ 55°40.133′
The Meteoritical Bulletin 96
For NWA 4910 the main mass holder is Pectay and the number of pieces is 5.

ADDITIONAL METEORITE CORRECTIONS AND UPDATES

United Arab Emirates 001 coordinates are 22°50′45.76″N, 55° 7′16.35″E.

Main mass is located at Environment Agence—Abu Dhabi, P.O. Box 45553, United Arab Emirates (*EAD*).

Yamato-980524 reclassified as EL6, Kamacite contains 1.1 wt% Si and 6.2 wt% Ni (A. E. Rubin).

New information on the history of NWA 2990 is that it was purchased from a nomad near the Morocco-Mauritania border, but the original find location is not known.

ABBREVIATION

Classifiers, type specimen locations, finders and holders of main masses

CASLEO—Complejo Astronomico El Leoncito, Av. Espana, 1512 Sur, CP J5402DSP, San Juan, Argentina:

UAb—University of Alberta, Alberta T6G 2E3, Canada.

A key to abbreviations for addresses used in *The Meteoritical Bulletin* is found at our website, http://tin.er.usgs.gov/meteor/MetBullAddresses.php.

Listed throughout most of the tables within the "Info" column are relevant data on who classified the samples, where the type specimen is located, etc. Below is a key to the abbreviations used within this edition.

ADDITIONAL ABBREVIATIONS USED WITHIN THE TEXT

EPMA—Electron microprobe analysis.

ICP-MS—Inductively coupled plasma–mass spectroscopy.

INAA—Instrumental neutron activation analysis.

PCP—Poorly characterized phase.

XRD—X-ray diffraction.

Acknowledgments—The Editor wishes to thank the Nomenclature Committee and all submitters, classifiers, collectors, and dealers of meteorites who have participated in *The Meteoritical Bulletin*. The editor is also very grateful to the Editor of *MaPS*, Dr. T. Jull, all those in the *MaPS* office and especially the Managing Editor, A. Baier, for all their hard work in producing the bulletin.

REFERENCE

Rubin A. E., Trigo-Rodrígez J. M., Huuber H., and Wasson J. T. 2007. Progressive aqueous alteration of CM carbonaceous chondrites. *Geochimica et Cosmochimica Acta* 71:2361–2382.

Table 1. Meteorite finds from Northwest Africa.

Name	Location of recovery or purchase	Date of recovery or purchase	Total known mass (g)	Number of pieces	Class	Shock	Weathering grade	Fa mol%
NWA 1277	Tagounite, Morocco	2001	1200	1	CO3.6	S2	W1	30.6
NWA 1521	Morocco/Algeria	October 2001	414	1	H3	S2	W1	13.4–28.0 av. 20.7
NWA 1989	Morocco	2002	44	1	LL5		W3	
NWA 2001	Morocco/Algeria	December 2002	832	1	H/L4	S2–6	W0	21.5–22.5 av. 22.0
NWA 2021	Morocco/Algeria	November 2002	57.6	1	H6		W3	
NWA 2022	Morocco/Algeria	November 2002	57	1	L6		W1	
NWA 2023	Morocco/Algeria	November 2002	14400	177	L4/5		W1	
NWA 2024	Morocco/Algeria	November 2002	104.1	2	H5		W3	
NWA 2025	Morocco/Algeria	2001	61	1	L6		W1	
NWA 2026	Morocco/Algeria	2001	27.6	1	L6		W2	
NWA 2027	Morocco/Algeria	2001	89.3	1	L4		W2	
NWA 2028	Morocco/Algeria	2001	25.5	1	L6		W1	
NWA 2029	Morocco/Algeria	2001	80.7	1	L4		W1	
NWA 2030	Morocco/Algeria	2001	17.7	1	L5		W1	
NWA 2031	Morocco/Algeria	2001	29.4	1	L5		W1	
NWA 2032	Morocco	December 2002	393	1	H4/5		W1	
NWA 2034	Morocco/Algeria	June 2003	240	1	L4	S4	W1	23.7–24.5
NWA 2035	Morocco/Algeria	June 2003	6580	6580	H3		W1	14.4–24.6 av. 16.3
NWA 2334	Morocco	2003	3136	1	L5		W1	
NWA 2335	Morocco/Algeria	June 2002	114	114	H 3.05	S1	W1	12.1–27.3
NWA 2336	Morocco/Algeria	June 2002	402	402	H 3.10	S2	W0–1	6.4–35.7 av. 14.8
NWA 2337	Morocco/Algeria	May 2004	145.8	1	H5		W2	
NWA 2338	Morocco/Algeria	May 2004	494	1	H6		W2	
NWA 2348	Morocco/Algeria	November 2004	365.3	9	H5		W3	
NWA 2349	Morocco/Algeria	May 2004	98	1	L3/4		W1	
NWA 2557	Morocco/Algeria	May 2004	18.7	1	L5		W1	
NWA 2558	Morocco/Algeria	May 2004	46	1	L5		W1–2	
NWA 2559	Morocco/Algeria	June 2004	412	1	H4		W2	
NWA 2560	Morocco/Algeria	July 2004	549	1	H4		W2	17.9–19.1
NWA 2561	Algeria	2003	67.9	1	LL5		W2–3	
NWA 2562	Algeria	2003	52.3	1	LL5		W2–3	
NWA 2563	Morocco/Algeria	July 2004	1175	1	L5		W2	
NWA 2564	Morocco/Algeria	July 2004	540	1	L5/6		W1–2	
NWA 2565	Morocco/Algeria	July 2004	526	1	L5		W1	24.0–25.0
NWA 2566	Morocco/Algeria	July 2004	412	1	L6		W1–2	
NWA 2567	Morocco/Algeria	July 2004	351	1	H5		W1–2	

Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[1]	Type specimen mass (g)	Type specimen location	Main mass[2]	Comments
			Rubin, *UCLA*	29.16	*UCLA*	Unknown	
11.6–25.0 av. 18.3		5.25	*Barto1*	20.0	*VI*	Eger	$Fs_{11}Wo_{40}$
		3.99	*Barto2*	9.9	*VI*	Barto	
18.3–21.3 av. 19.3		5.21	*Barto1*	20.4	*TUBS*	Merz	$En_{45}Wo_{48}$/kamacite Co 5.1–8.5 mg g^{-1}. Plot in the Fa between H and L.
		5.03	*Barto2*	13.8	*VI*	Flemming	Shock veins
		4.74	*Barto2*	17.1	*VI*	Flemming	
		4.89	*Barto2*	19.9	*VI*	Gabel	Breccia, possibly paired with NWA 869
		4.94–4.97	*Barto2*	20.6	*VI*	Gabel	
		4.90	*Barto2*	11.8	*VI*	Frey	
		4.85	*Barto2*	6.1	*VI*	Frey	
		4.80	*Barto2*	19.5	*VI*	Frey	
		4.84	*Barto2*	4.9	*VI*	Frey	Shock veins
		4.91	*Barto2*	16.9	*VI*	Frey	Shock veins
		4.63	*Barto2*	4.7	*VI*	Frey	
		4.78	*Barto2*	8.7	*VI*	Frey	
		5.41	*Barto2*	20.0	*VI*	Neu	
11.6–20.4		5.05	*Barto1*	20.0	*Kiel*	Eger	$En_{48}Wo_{45}$
5.6–22.2 av. 13.6		4.34	*Barto3*	20.2	*VI*	Eger	Olivine: Cr_2O_3 0.16, $\sigma-Cr_2O_3$ 0.17 (wt%); $\delta^{17}O = 4.13$, $\delta^{18}O = 6.52$
		4.93	*Barto2*	23.9	*VI*	Köhler	Breccia of light fragments in dark matrix with melt pools
9.1–21.3		3.89	*Barto3*	20.0	*VI*	Pacer	Olivine: Cr_2O_3 0.19, $\sigma-Cr_2O_3$ 0.44 (wt%); $\delta^{17}O = 4.14$, $\delta^{18}O = 7.11$
6.6–14.6 av. 10.6		4.05	*Barto3*	20.9	*TUBS*	Pacer	Olivine: Cr_2O_3 0.23, $\sigma-Cr_2O_3$ 0.35 (wt%); $\delta^{17}O = 4.13$, $\delta^{18}O = 6.52$; silicates: Fe/Mn 33.9, Fe/Mg 0.15
		4.80	*Barto2*	27.8	*TUBS*	Schwidurski	
		5.01	*Barto2*	20.6	*TUBS*	Spreemann	
		4.81–5.02	*Barto2*	20.1	*VI*	Gabel	
		4.93	*Barto2*	21.5	*VI*	Bilet	Breccia
		4.73	*Barto2*	4.4	*VI*	Bilet	
		4.81	*Barto2*	9.1	*Kiel*	Bilet	
		5.10	*Barto2*	23.0	*TUBS*	Bilet	
15.9–18.3		4.74	*Barto1*	31.6	*TUBS*	Barto	
		4.23	*Barto2*	15.1	*VI*	Barto	
		4.13	*Barto2*	11.1	*VI*	Barto	
		4.68	*Barto2*	20.8	*VI*	Spreemann	
		4.83	*Barto2*	22.6	*VI*	Spreemann	
20.8–21.1		5.17	*Barto1*	19.5	*VI*	Spreemann	
		4.92	*Barto2*	25.4	*Kiel*	Spreemann	
		5.19	*Barto2*	20.0	*VI*	Spreemann	

Table 1. *Continued.* Meteorite finds from Northwest Africa.

Name	Location of recovery or purchase	Date of recovery or purchase	Total known mass (g)	Number of pieces	Class	Shock	Weathering grade	Fa mol%
NWA 2568	Morocco/Algeria	November 2004	27.1	3	H5		W2	
NWA 2569	Morocco/Algeria	November 2004	332.4	3	H5		W1–2	
NWA 2573	Morocco/Algeria	December 2003	224.1	1	L5		W2	24.4–25.2
NWA 2574	Morocco/Algeria	November 2004	316.1	1	H4		W1	17.5–18.6
NWA 2575	Morocco/Algeria	November 2004	254.8	1	H6	S1	W4	17.8–18.3
NWA 2577	Morocco/Algeria	June 2004	356.5	1	L5		W0–1	24.3–24.7
NWA 2580	Morocco/Algeria	October 2003	60.5	60.5	H3	S1	W1	6.1–18.9 av. 13.0
NWA 2581	Morocco/Algeria	November 2004	494.4	1	L5/6		W1	25.1–25.9
NWA 2583	Morocco/Algeria	June 2004	512.2	1	L3/4		W0–1	23.8–26.4
NWA 2585	Morocco/Algeria	November 2004	547.8	14	L4		W2–3	
NWA 2586	Morocco/Algeria	November 2004	24.3	2	L5		W1	
NWA 2587	Morocco/Algeria	November 2004	26.2	2	L6		W2	
NWA 2588	Morocco/Algeria	November 2004	23.6	2	L6		W2	
NWA 2589	Morocco/Algeria	November 2004	62.8	2	L6		2–3	
NWA 2590	Morocco/Algeria	November 2004	25.4	2	L5		W3	
NWA 2591	Morocco/Algeria	November 2004	49.6	49.6	H4		W3	17.1–17.7
NWA 2592	Morocco/Algeria	November 2004	33.4	1	H6		W1–2	
NWA 2593	Morocco/Algeria	November 2004	24.2	1	H5		W2	
NWA 2594	Morocco/Algeria	November 2004	86.8	1	H4/5		W1	
NWA 2595	Morocco/Algeria	November 2004	59.1	3	H5		W1	
NWA 2596	Morocco/Algeria	November 2004	12.3	1	L6		W3	
NWA 2597	Morocco/Algeria	November 2004	73.7	1	L5		W2–3	
NWA 2598	Morocco/Algeria	November 2004	28.4	1	L5		W1–2	23.8–24.5
NWA 2599	Morocco/Algeria		234.5	1	LL5	S2	W1	28.6–29.2
NWA 2601	Morocco/Algeria		576	1	L3		W1	18.7–25.7 av. 22.2
NWA 2602	Morocco/Algeria	November 2004	4.8	1	L6		W1	
NWA 2603	Morocco/Algeria	November 2004	21.9	1	L6		W2	
NWA 2604	Morocco/Algeria	November 2004	6.9	1	H6		W2	
NWA 2605	Morocco/Algeria	November 2004	15.4	2	H6		W2	
NWA 2606	Morocco/Algeria	November 2004	164.8	1	L5		W1	24.9–25.5
NWA 2607	Morocco/Algeria	November 2004	499	1	H4		W3–4	17.9–20.9
NWA 2608	Morocco/Algeria	November 2004	11.8	1	L4/5		W1	24.7–25.5
NWA 2609	Morocco/Algeria	November 2004	2180	1	L4–6		W1	
NWA 2610	Algeria/Morocco	April 2007	7000	7000	H3	S2	W1	8.9–24.5 av. 19.0
NWA 2612	Morocco/Algeria		1109	1	H5		W2	17.0–18.0
NWA 2614	Morocco	November 1999	1500	1	L6		W2–3	
NWA 2615	Morocco/Algeria		202.8	2	H6		W3–4	18.5–18.9
NWA 2616	Morocco/Algeria	November 2004	106.5	1	L4		W1	24.5–24.9
NWA 2617	Morocco/Algeria	November 2004	472	1	H/L 4		W2	19.5–20.5
NWA 2733	Morocco	2007	279	1	CO3.6			37.1–44.6
NWA 2751	Rissani, Morocco	2005	43	1	Eucrite			
NWA 2752	Risanni, Morocco	2005	28	1	Howardite			
NWA 3225	NWA	June 2006	1845	2	L6	S3	W1	25.3–26.5
NWA 3226	NWA	June 2006	1076	1	L6		W2–3	
NWA 3227	NWA	June 2006	75	1	L6		W1	

Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[1]	Type specimen mass (g)	Type specimen location	Main mass[2]	Comments
		4.98–5.11	*Barto2*	5.6	*VI*	Gehler	
		5.09–5.31	*Barto2*	26.6	*Kiel*	Gehler	
20.7–22.3		4.51	*Barto1*	20.0	*VI*	HSSH	
15.8–16.9		4.89	*Barto1*	20.5	*VI*	HSSH	
15.9–16.9		4.88	*Barto1*	20.1	*Kiel*	HSSH	$An_{11}Or_5$
19.8–20.6		5.14	*Barto1*	20.0	*Kiel*	HSSH	
1.5–9.9 av. 5.7		4.29	*Barto4*	12.4	*VI*	HSSH	$\delta^{17}O$ = 3.395, $\delta^{18}O$ = 5.35; silicates: Fe/Mn 33.5, Fe/Mg 0.13
21.3–21.7		4.49	*Barto1*	20.9	*Kiel*	HSSH	$An_{10-11}Or_{6-8}$
15.4–22.4		5.06	*Barto1*	20.4	*Kiel*	HSSH	$An_{48}Or_1$
		4.65–4.89	*Barto2*	20.0	*VI*	Gehler	
		4.84–4.97	*Barto2*	4.8	*VI*	Gehler	Melt pools
		4.59–4.61	*Barto2*	6.0	*VI*	Gehler	
		4.71–4.80	*Barto2*	5.9	*VI*	Gehler	
		4.79–4.83	*Barto2*	17.3	*Kiel*	Gehler	
		4.41–4.49	*Barto2*	5.7	*VI*	Gehler	
15.4–16.2		4.46–4.58	*Barto4*	10.3	*Kiel*	Gehler	$\delta^{17}O$ = 4.36, $\delta^{18}O$ = 7.47
		4.98	*Barto2*	6.7	*VI*	Gehler	
		5.07	*Barto2*	4.8	*VI*	Gehler	
		5.4	*Barto2*	17.4	*VI*	Gehler	
		5.26	*Barto2*	11.3	*VI*	Gehler	
		4.4	*Barto2*	2.5	*VI*	Gehler	
		4.57	*Barto2*	14.8	*VI*	Gehler	
19.8–21.6		4.72	*Barto1*	5.9	*VI*	Gehler	
23.6–24.0		3.86	*Barto1*	20.7	*Kiel*	AitAzziz	$En_{45}Wo_{44}$; $An_{10}Or_2$; breccia
18.6–22.8		4.82	*Barto1*	22.4	*Kiel*	AitAzziz	$An_{11}Or_{5-7}$; kamacite 0.5–1.4% Co. Melt veins
		4.86	*Barto2*	0.95	*VI*	Gehler	
		4.87	*Barto2*	5.1	*VI*	Gehler	
		5.04	*Barto2*	1.4	*VI*	Gehler	
		5.21	*Barto2*	3.6	*VI*	Gehler	
20.7–21.5		4.57	*Barto1*	20.0	*VI*	Gehler	$En_{46}Wo_{46}$
16.3–17.6		4.72	*Barto1*	20.0	*VI*	Gehler	Melt rich
20.8–21.6		4.8	*Barto1*	2.4	*Kiel*	Gehler	$En_{78}Wo_{14}$. Breccia
		4.86	*Barto2*	1783	*UGÖ*	UGÖ	Breccia
24.9–3.2 av. 11.7		4.27	*Barto3*	20.0	*Kiel*	Anon	$\delta^{17}O$ = 4.14, $\delta^{18}O$ = 7.11
15.1–16.1		4.86	*Barto1*	21.5	*VI*	Barto	Melt pockets
		4.49	*Barto2*	22.9	*Kiel*	Altmann	Melt pockets
16.2–16.8		4.59	*Barto1*	20.8	*Kiel*	AitAzziz	
20.5–20.9		4.91	*Barto1*	20.7	*Kiel*	Gehler	Breccia
16.2–21.2		4.93	*Barto1*	20.1	*Kiel*	Gehler	Kamazite 6.2–6.9% Co; An_{12-13}. Fusion crust 3 mm thick
6–9.2			Bunch, *NAU*	26	*NAU*	*Kuyken*	
47–61	2.1–3.0		Bunch, *NAU*	9.2	*PSF*	Morgan	
46–62	2.4–3.3		Bunch and Wittke, *NAU*	5.9	*PSF*	Morgan	
21.1–21.6		5.02–5.08	*Barto1*	20.0	*Kiel*	Gehler	$An_{10-13}Or_5$
		4.7	*Barto2*	37.5	*Kiel*	Gehler	
		4.64	*Barto2*	16.1	*Kiel*	Gehler	

Table 1. *Continued*. Meteorite finds from Northwest Africa.

Name	Location of recovery or purchase	Date of recovery or purchase	Total known mass (g)	Number of pieces	Class	Shock	Weathering grade	Fa mol%
NWA 3228	NWA	June 2006	905	1	H5		W2	
NWA 3229	NWA	June 2006	841	1	L/LL5		W1–2	
NWA 3230	Zagora	April 2007	322	1	Ureilite			9.1–16.9
NWA 3231	NWA	June 2006	231	1	L4		W1–2	
NWA 3232	Ensisheim	June 2007	49	1	Ureilite			12.8–32.5
NWA 3233	NWA	June 2006	121	1	H3	S2	W4	
NWA 3234	NWA	June 2006	653	1	L6		W1–2	
NWA 3235	NWA	June 2006	2601	2	L6		W1–2	
NWA 3236	NWA	June 2006	663	1	H4		W2	
NWA 3237	NWA	June 2006	638	1	H6		W2–3	
NWA 3238	NWA	June 2006	400	1	L/LL 6		W4	
NWA 3239	NWA	June 2006	685	1	H5		W1–2	
NWA 3240	Algeria/Morocco	November 2004	3.8	3	Mesosiderite		–	–
NWA 3241	NWA	June 2006	473	1	H3		W3	
NWA 3242	NWA	June 2006	8.6	1	H6		W1	
NWA 3243	NWA	June 2006	542	1	L6		W2–3	
NWA 3244	NWA	June 2006	71	1	Mesosiderite		–	–
NWA 3245	NWA	June 2006	647	1	L6		W2	
NWA 3246	NWA	June 2006	424	2	H5		W1	
NWA 3247	NWA	June 2006	100	1	H6		W2–3	
NWA 3248	NWA	June 2006	338	1	L6		W2–3	
NWA 3249	NWA	June 2006	114	2	H5		W1	
NWA 3250	Germany	2006	916	1	Primitive achon, ungrouped			37.4–38.1
NWA 3251	NWA	June 2006	928	1	L6		W1–2	
NWA 3252	NWA	June 2006	83	1	H6		W1	
NWA 3253	NWA	June 2006	88	1	L6		W2	
NWA 3254	NWA	June 2006	82	2	L6		W2	
NWA 3255	NWA	June 2006	147	1	L3	S3	W2	
NWA 3256	NWA	June 2006	137	1	L6		W2	
NWA 3257	NWA	June 2006	73	1	L6		W4	
NWA 3258	NWA	June 2006	231	1	H5		W2–3	
NWA 3259	NWA	June 2006	240	1	H6		W3	
NWA 3261	NWA	June 2006	344	1	H6		W2–3	
NWA 3262	NWA	June 2006	182	2	L4		W3	
NWA 3263	NWA	June 2006	250	1	L5		W1	
NWA 3264	NWA	June 2006	145	1	L/LL 5	S3	W1–2	
NWA 3265	NWA	June 2006	132	1	H5		W2	
NWA 3266	NWA	June 2006	138	1	H5	S2	1–2	19.2–19.8
NWA 3267	NWA	June 2006	33	1	L 4–6		W1	
NWA 3268	NWA	June 2006	174	1	H6		W4	

Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[1]	Type specimen mass (g)	Type specimen location	Main mass[2]	Comments
		5.1	*Barto2*	30.1	*Kiel*	Gehler	
		4.41	*Barto2*	20.0	*Kiel*	Gehler	
14.2–15.2		4.68	*Barto1*	20.0	*Kiel*	Anon	Piogenite Wo_6, Cr_2O_3 1.13 wt%
		4.91	*Barto2*	20.0	*Kiel*	Gehler	
18.3–25.6		4.00	*Barto1*	9.9	*Kiel*	Barto	Piogenite $Wo_{7–8}$, Cr_2O_3 1.17 wt%
		5.05	*Barto2*	20.0	*Kiel*	Gehler	
		4.89	*Barto2*	20.0	*Kiel*	Gehler	Impact melt areas
		4.89	*Barto2*	20.0	*Kiel*	Gehler	
		4.91	*Barto2*	22.0	*Kiel*	Gehler	Impact melt areas
		4.81	*Barto2*	27.0	*Kiel*	Gehler	Melt veins
		4.34	*Barto2*	23.1	*Kiel*	Gehler	May be paired with NWA 3279. Magnetic susceptibility intermediate between L and LL
		5.3	*Barto2*	20.7	*Kiel*	Gehler	
29.9–31.6		5.29	*Barto1*	0.8	*Kiel*	Gehler	$An_{93–94}Or_{<1}$; kamacite Ni 2.8–5.9, Co 0.7–0.8 wt%
		4.96	*Barto2*	20.0	*Kiel*	Gehler	
		5.19	*Barto2*	2.4	*Kiel*	Gehler	
		4.58	*Barto2*	20.0	*Kiel*	Gehler	Melt veins, may be paired with NWA 3245
28.2–29.5		5.15	*Barto1*	17.6	*Kiel*	Gehler	$An_{92–95}Or_{<1}$; kamacite Ni 5, Co 0.7wt%
		4.45	*Barto2*	32.0	*Kiel*	Gehler	Shock veins and melt pools, may be paired with NWA 3243
		5.16	*Barto2*	20.0	*Kiel*	Gehler	
		5.07	*Barto2*	20.0	*Kiel*	Gehler	
		4.57	*Barto2*	20.0	*Kiel*	Gehler	
		5.32–5.37	*Barto2*	22.2	*Kiel*	Gehler	
29.6–30.6		4.74	*Barto4*	20.0	*Kiel*	Haiderer	See separate entry
		4.72	*Barto2*	20.0	*Kiel*	Gehler	Melt veins
		5.3	*Barto2*	16.4	*Kiel*	Gehler	
		4.73	*Barto2*	17.6	*Kiel*	Gehler	
		4.73	*Barto2*	18.2	*Kiel*	Gehler	Impact melt areas
		4.64	*Barto2*	20.1	*Kiel*	Gehler	
		4.72	*Barto2*	20.0	*Kiel*	Gehler	Impact melt areas
		4.54	*Barto2*	20.9	*Kiel*	Gehler	
		4.83	*Barto2*	23.0	*Kiel*	Gehler	
		4.89	*Barto2*	22.2	*Kiel*	Gehler	
		5.17	*Barto2*	29.0	*Kiel*	Gehler	
		4.67–4.73	*Barto2*	20.1	*Kiel*	Gehler	
		4.79	*Barto2*	20.0	*Kiel*	Gehler	
		4.5	*Barto2*	20.4	*Kiel*	Gehler	Magnetic susceptibility intermediate between L and LL
		5.1	*Barto2*	22.3	*Kiel*	Gehler	
16.5–17.6		5.03	*Barto1*	21.9	*Kiel*	Gehler	
		4.85	*Barto2*	6.6	*Kiel*	Gehler	
		4.74	*Barto2*	20.0	*Kiel*	Gehler	

Table 1. *Continued.* Meteorite finds from Northwest Africa.

Name	Location of recovery or purchase	Date of recovery or purchase	Total known mass (g)	Number of pieces	Class	Shock	Weathering grade	Fa mol%
NWA 3269	NWA	June 2006	139	1	L/LL 3	S3	W2	
NWA 3270	Algeria	July 2006	943	12	Eucrite, polymict		–	–
NWA 3271	NWA	June 2006	113	1	H4		W1–3	
NWA 3272	NWA	June 2006	87	1	L6		W1	
NWA 3273	NWA	June 2006	100	2	L4		W1	
NWA 3274	NWA	June 2006	107	1	L 3–5		W0–1	
NWA 3275	NWA	June 2006	107	1	L5		W1	
NWA 3276	NWA	June 2006	91	1	L6	S1	W3	
NWA 3277	NWA	June 2006	2094	1	L4	S3	W2	24.6–27.6
NWA 3278	NWA	June 2006	67	1	LL6		W2	
NWA 3279	NWA	June 2006	33	1	L/LL 6		W4	
NWA 3280	Ensisheim	June 2007	39	1	Ureilite			16.4–26.6
NWA 3281	NWA	June 2006	49	1	LL6		W1–2	
NWA 3282	NWA	June 2006	56	1	L6		W1	
NWA 3283	NWA	June 2006	4573	1	L/LL 6		W1–3	
NWA 3284	NWA	June 2006	66	1	L6		W1–2	
NWA 3285	NWA	June 2006	48	1	L4		W1–2	
NWA 3286	NWA	June 2006	41	1	L4		W2–3	
NWA 3287	NWA	June 2006	30	1	L6		W1	
NWA 3288	NWA	June 2006	41	1	L/LL 6		W1–2	
NWA 3289	NWA	June 2006	31	1	L/LL 6		W1–2	
NWA 3290	Ensisheim	June 2007	79.9	22	Ureilite			4.7–10.3
NWA 3291	NWA	June 2006	25	1	H6		W1	
NWA 3292	NWA	June 2006	31	1	H5		W2	
NWA 3293	NWA	June 2006	13	1	L5		W2–3	
NWA 3294	NWA	June 2006	10	1	L5		W1	
NWA 3295	NWA	June 2006	16	1	H4	S2	W2	19.3–20.4
NWA 3296	NWA	June 2006	15	1	LL6		W1	
NWA 3297	NWA	June 2006	9	1	LL6		W2	
NWA 3298	NWA	June 2006	34	1	L6		W1	
NWA 3299	NWA	June 2006	489	1	H5	S1	W2	18.6–19.7
NWA 3300	Morocco	May 2007	74.3	1	LL melt rock		W0	31.3–34.0

Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[1]	Type specimen mass (g)	Type specimen location	Main mass[2]	Comments
		4.46	*Barto2*	21.8	*Kiel*	Gehler	Magnetic susceptibility intermediate between L and LL
52–55		3.01	*Barto1*	20.1	*Kiel*	Anon	Pigeonite $Fs_{39-55}En_{35-30}Wo_{25-6}$; plagioclase $An_{81-92}Or_{<2.3}$
		5.21	*Barto2*	20.0	*Kiel*	Gehler	
		4.69	*Barto2*	18.2	*Kiel*	Gehler	
		4.63–4.70	*Barto2*	20.8	*Kiel*	Gehler	
		4.78	*Barto2*	21.2	*Kiel*	Gehler	Breccia
		4.77	*Barto2*	20.0	*Kiel*	Gehler	
		4.74	*Barto2*	19.7	*Kiel*	Gehler	
21.9–22.3		5.03	*Barto1*	22.5	*Kiel*	Gehler	$En_{46}Wo_8$; $An_{10}Or_{4-7}$; kamacite Co 0.7–1.0; breccia
		4.37	*Barto2*	13.9	*Kiel*	Gehler	
		4.24	*Barto2*	6.6	*Kiel*	Gehler	May be paired with NWA 3238. Magnetic susceptibility intermediate between L and LL
16.2–19.9		4.46	*Barto1*	8.1	*Kiel*	Barto	Pigeonite Wo_{7-9}, Cr_2O_3 1.12%
		4.41	*Barto2*	10.5	*Kiel*	Gehler	
		4.61	*Barto2*	11.2	*Kiel*	Gehler	
		4.45	*Barto2*	21.0	*Kiel*	Gehler	Magnetic susceptibility intermediate between L and LL
		4.89	*Barto2*	15.9	*Kiel*	Gehler	
		4.83	*Barto2*	9.6	*Kiel*	Gehler	
		4.83	*Barto2*	8.2	*Kiel*	Gehler	Melt pools
		4.96	*Barto2*	7.4	*Kiel*	Gehler	
		4.57	*Barto2*	9.3	*Kiel*	Gehler	Magnetic susceptibility intermediate between L and LL
		4.42	*Barto2*	6.2	*Kiel*	Gehler	Magnetic susceptibility intermediate between L and LL
6.0–9.7		4.00–4.16	*Barto1*	16.1	*Kiel*	Barto	Pigeonite Wo_7, Cr_2O_3 0.97%; bimodal texture
		4.99	*Barto2*	5.0	*Kiel*	Gehler	Impact melt pockets
		5.19	*Barto2*	8.0	*Kiel*	Gehler	
		4.62	*Barto2*	2.6	*Kiel*	Gehler	
		4.67	*Barto2*	2.0	*Kiel*	Gehler	Breccia
17.3–20.3		4.94	*Barto1*	3.3	*Kiel*	Gehler	$An_{14}Or_4$
		4.37	*Barto2*	3.0	*Kiel*	Gehler	
		4.29	*Barto2*	2.0	*Kiel*	Gehler	
		4.78	*Barto2*	6.6	*Kiel*	Gehler	
16.4–17.3		4.99	*Barto1*	20.0	*Kiel*	Gehler	$An_{12}Or_{4-6}$
23.2–28.1		3.79	*Barto4*	14.9	*Kiel*	Barto	$An_{10-11}Or_{3-5}$; $\delta^{17}O$ = 3.81, $\delta^{18}O$ = 4.56

Table 1. *Continued.* Meteorite finds from Northwest Africa.

Name	Location of recovery or purchase	Date of recovery or purchase	Total known mass (g)	Number of pieces	Class	Shock	Weathering grade	Fa mol%
NWA 3301	Algeria/Morocco	February 2007	1.5	1	Eucrite, polymict		–	–
NWA 3302	NWA	February 2006	42.4	42.4	H3.05	S1		9.6–23.6 av. 14.7
NWA 3303	NWA	February 2006	85.1	1	L3	S1		1.1–32.8 av. 22.3
NWA 3305	Erfoud	February 2006	82.1	Many	Acapulcoite	S4		7.6–8.0
NWA 3306	NWA	2005	595	1	H4/5		W1	
NWA 3307	NWA	December 2005	263	1	L/LL 4		W1–2	
NWA 3308	NWA	December 2005	327	1	L6		W3	
NWA 3309	NWA	December 2005	1372	1	H4/5		W1	
NWA 3310	Algeria	July 2006	679	1	Eucrite, polymict		–	–
NWA 3311	NWA	2006	7.09	1	Howardite		–	–
NWA 3312	NWA	November 2005	169	1	L5		W1–2	
NWA 3313	NWA	November 2005	245	1	L6		W2–3	
NWA 3314	NWA	November 2005	296	1	H5		W2	
NWA 3315	NWA	November 2005	251	1	LL5		W2	
NWA 3316	NWA	November 2005	280	1	LL6		W2	
NWA 3318	NWA	November 2005	764	1	LL5		W1	28.1–29.2
NWA 3319	NWA	November 2005	221.3	1	H ~4/5		W1	
NWA 3321	NWA	January 2006	71.8	1	H5		W4	17.8–18.8
NWA 3323	NWA	November 2004	338.6	1	L4		W1	22.5–25.1
NWA 3324	NWA	November 2004	180	1	LL4		W2–3	30.2–31.8
NWA 3334	Morocco	2003	41.5	1	L melt rock			24.3
NWA 3335	Rissani, Morocco	2003	2250	1	LL3.2			
NWA 4216	J'diriya, W. Sahara	2005	1990	1	LL <3.3			12.2 ± 8.4

Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[1]	Type specimen mass (g)	Type specimen location	Main mass[2]	Comments
57–32		2.41	*Barto1*	0.3	*Kiel*	Bilet	Pigeonite $Fs_{57-32}En_{34-63}Wo_{11-5}$, augite $Fs_{53-39}En_{23-31}$ Wo_{24-33}; An_{80-94}
2.2–30.7 av. 13.3		4.04	*Barto4*	8.6	*Kiel*	HSSH	Olivine: Cr_2O_3 0.43, σ–Cr_2O_3 0.17 (wt%); $\delta^{17}O = 3.94$, $\delta^{18}O = 5.98$; silicates: Fe/Mn 33.1, Fe/Mg 0.17
3.1–24.7 av. 15.0		4.14	*Barto4*	17.0	*Kiel*	HSSH	Kamacite Co 0.5–3.1 wt%; $\delta^{17}O = 3.74$, $\delta^{18}O = 5.29$
8.7–9.3		4.59	*Barto1*	16.8	*Kiel*	HSSH	$Fs_{5-4}Wo_{41-45}$; $An_{18-20}Or_3$; Fe/Mn = 12.4; possibly paired with NWA 2656, 2714 and 2989
		5.17	*Barto2*	21.8	*Kiel*	Anon	
		4.44	*Barto2*	22.3	*Kiel*	Anon	Magnetic susceptibility intermediate between L and LL
		4.64	*Barto2*	22.4	*Kiel*	Anon	Shock vein
		5.06	*Barto2*	23.4	*Kiel*	Anon	
57.0		3.35	*Barto1*	20.3	*Kiel*	Barto	Pigeonite $Fs_{40-56}En_{36-30}Wo_{26-8}$; $An_{83-9}0Or_{<2}$; kamacite Ni 0.5, Co 0.3 wt%.
54–60		2.58	*Barto4*	1.4	*Kiel*	Haiderer	Pigeonite $Fs_{51-55}Wo_{9-6}$; augite $Fs_{24-38}Wo_{45-29}$; $An_{84-92}Or_{<1}$; diogenite and opx about 25%. $\delta^{17}O = 1.51$, $\delta^{18}O = 3.31$
		4.60	*Barto2*	22.6	*Kiel*	Gabel	Breccia
		4.52	*Barto2*	23.0	*Kiel*	Gabel	Impact melt veins
		5.05	*Barto2*	26.5	*Kiel*	Gabel	
		4.33	*Barto2*	21.8	*Kiel*	Gabel	Breccia
		4.29	*Barto2*	22.5	*Kiel*	Gabel	
9.5–23.3		4.34	*Barto1*	22.3	*Kiel*	GiPo	Breccia
		5.17	*Barto2*	22.0	*Kiel*	GiPo	Breccia
15.7–16.7		4.92	*Barto1*	14.9	*Kiel*	Giessler	
17.0–20.9		4.97	*Barto1*	20.7	*Kiel*	Bilet	$An_{10-14}Or_{5-9}$. Breccia with impact melt inclusions, may be paired with NWA 2349
24.2–26.8		3.95	*Barto1*	20.0	*Kiel*	Bilet	$En_{30-54}Fs_{40-57}Wo_{26-6}$. $An_{65-94}Or_{<3}$. $\delta^{17}O = 1.51$, $\delta^{18}O = 3.31$
20.5	2.3		Bunch, *NAU*	8.2	*PSF*	*PSF*	See separate entry
			Bunch, *NAU*	20	*PSF*	*PSF*	See separate entry
6.01 ± 5.1	0.41 ± 0.32		A. Rubin, *UCLA*	23	*UCLA*	*Morgan*	A single, completely fusion crusted stone was purchased in J'diriya

Table 1. *Continued*. Meteorite finds from Northwest Africa.

Name	Location of recovery or purchase	Date of recovery or purchase	Total known mass (g)	Number of pieces	Class	Shock	Weathering grade	Fa mol%
NWA 4530	Algeria	September 2006	35.9	1	CO3			0.03–72
NWA 4550	Erfoud	2006	70	1	Diogenite			37.8
NWA 4553	Erfoud	2006	531	1	L3.7			18.6–27.7
NWA 4560	Erfoud	2006	400	5	LL3.2			6.7–32.5
NWA 4658	Erfoud	2005	167	1	LL4			27.8
NWA 4765	Erfoud	2006	19	1	CM1	Low	Low	
NWA 4817	Morocco	2006	683	1	CV3			0.6–57.7
NWA 4818	Morocco	2006	388	1	CV3			1.45–53.6
NWA 4823	Morocco	2006	620	11	LL3.3			3.6–34.8
NWA 4834	Algeria	2006	50	1	Eucrite			
NWA 4901	Erfoud	2007	24	1	Achondrite (ungrouped)	Low	Low	34.4–62.5
NWA 4965	Morocco	2007	1023	1	Diogenite			24.1
NWA 4966	Morocco	2007	416	1	CK4			34.4
NWA 4967	Algeria	2007	689	2	CO3.2			2.1–63
NWA 4968	Algeria	2007	366	1	Eucrite			
NWA 5024	Erfoud, Morocco	2007	100	1	CK4			31.8 ± 0.9
NWA 5025	Erfoud, Morocco	2007	53	1	CK4			31.4 ± 0.2
NWA 5026	Erfoud, Morocco	2007	2073	1	LL3.7			27.3 ± 5.1
NWA 5028	Erfoud, Morocco	2007	2445	1	CR2			0.6 ± 0.2
NWA 5084	Morocco	2001	810	1	L5			24.7
NWA 5085	Morocco	2001	565	1	L6			24.7
NWA 5106	Morocco	2001	28	1	L4			24.6
NWA 5111	Morocco	2001	16	1	L5			24.7
NWA 5114	Morocco	2001	27	1	L4			24.4
NWA 5116	Morocco	2001	17	1	L5			24.3
NWA 5117	Morocco	2001	13	1	L4			24.3
NWA 5119	Morocco	2001	7	1	L5			24.5
NWA 5120	Morocco	2001	12	1	L4			24.4
NWA 5121	Morocco	2001	9	1	L5			24.1
NWA 5122	Morocco	2001	11	1	L4			24.5
NWA 5123	Morocco	2001	13	1	L4			24.7
NWA 5126	Morocco	2001	13	1	L4			24.3
NWA 5127	Morocco	2001	15	1	L4			25
NWA 5129	Morocco	2001	277	1	L5			24.8
NWA 5130	Morocco	2007	23	1	CH3			0.2 = 6.0
NWA 5131	Morocco	2007	533	1	LL7			29.3
NWA 5132	Morocco	2007	67	1	L4			26.4

Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[1]	Type specimen mass (g)	Type specimen location	Main mass[2]	Comments
			Bunch and Wittke, *NAU*; Irving, *UWS*	6.4	*UWS*	Mani	See separate entry
27.4	2.2		Bunch, *NAU*	14.3	*NAU*	Aaronson	
14.3–23.6	2.4		Bunch, *NAU*	23	*NAU*	Aaronson	
1.4–27.7	1.8		Bunch, *NAU*	21.1	*NAU*	Cimala	Cr_2O_3 in olivine mean = 0 17 wt%
22.3	1.8		Bunch, *NAU*	21.1	*NAU*	Burkhard	
			A. Greshake, *MNB*	4	*MNB*	S. Ralew	Anhydrous silicates replaced by phyllosilicates. See separate entry
4.2–29.5			Bunch, *NAU*	25	*NAU*	Birdsell	
2.7–34.4			Bunch, *NAU*	20	*NAU*	Birdsell	Many small CAIs
2.6–25.5	1.2–2.7		Bunch, *NAU*	24	*NAU*	Birdsell	
57.4	3.2		Wittke and Bunch, *NAU*	10	*NAU*	M. Cimala	Polymict
6.5–39.7			A. Greshake, *MNB*	4.9	*MNB*	S. Ralew	Pairing of the meteorite with NWA 011, 2400, 2976, 4587 seems likely. See written description
17.5–38.2	1.2–3.2		Bunch, *NAU*	20.4	*NAU*	M. Cimala	Paired with NWA 4473
28.6	3.1		Bunch, *NAU*	21.1	*NAU*	M. Cimala	Cr_2O_3 in magnetite = 3.6 wt%
			Bunch and Wittke, *NAU*	20.2	*NAU*	M. Cimala	
59.3	4.3		Wittke and Bunch, *NAU*	20.4	*NAU*	M. Cimala	
			A. Rubin, *UCLA*	12	*UCLA*	*Morgan*	
7.3	49.4		A. Rubin, *UCLA*	22	*UCLA*	*Morgan*	
Fs15.6 ± 6.5			A. Rubin, *UCLA*	20.5	*UCLA*	*Morgan*	
1.5 ± 0.5	0.8 ± 0.2		A. Rubin, *UCLA*	22	*UCLA*	*Morgan*	
20.3	1.8		Bunch, *NAU*	47	*PSF*	*PSF*	
20.7	1.8		Bunch, *NAU*	38	*PSF*	*PSF*	
20.9	2.1		Bunch, *NAU*	7	*PSF*	*PSF*	Large GOP objects
21.2	1.5		Bunch, *NAU*	5	*PSF*	*PSF*	Crushed
20.3	1.8		Bunch, *NAU*	8	*PSF*	*PSF*	
21	1.8		Bunch, *NAU*	5	*PSF*	*PSF*	Crushed
20.7	1.9		Bunch, *NAU*	4	*PSF*	*PSF*	Polymict
20.5	2.2		Bunch, *NAU*	3	*PSF*	*PSF*	Crushed
20.2	1.8		Bunch, *NAU*	4	*PSF*	*PSF*	Crushed
20.5	1.9		Bunch, *NAU*	4	*PSF*	*PSF*	Crushed
20	1.2		Bunch, *NAU*	4	*PSF*	*PSF*	
20.7	1.2		Bunch, *NAU*	4	*PSF*	*PSF*	
20.1	1.9		Bunch, *NAU*	3	*PSF*	*PSF*	
21.1	1.5		Bunch, *NAU*	4	*PSF*	*PSF*	
21	1.8		Bunch, *NAU*	21.5	*PSF*	*PSF*	
0.3–1.8	0.8		Bunch and Wittke, *NAU*	4.6	*FMNH*	*FMNH*	
24.7	2		Bunch, *NAU*	21	*PSF*	*PSF*	No chondrules
22	1.9		Bunch, *NAU*	13.7	*PSF*	*PSF*	Large GOP objects

Table 1. *Continued*. Meteorite finds from Northwest Africa.

Name	Location of recovery or purchase	Date of recovery or purchase	Total known mass (g)	Number of pieces	Class	Shock	Weathering grade	Fa mol%
NWA 5133	Morocco	2007	235	1	L5			24.6
NWA 5197	Morocco	2006	289	1	LL3.2			22.4–34.2
NWA 5199	Morocco	2006	51	1	Howardite			
NWA 5201	Morocco	2007	11730	1	Ureilite			Core 21.1
NWA 5202	Morocco	2007	109	Many	CO3.8			37.4–41.3
NWA 5204	Morocco	2006	555	9	Eucrite			
NWA 5205	Morocco	2006	4000	Many	LL3.2			7.4–38.7
NWA 5206	Morocco	2007	128	1	LL3.05			8.5–36.6
NWA 5208	Morocco	2007	245	1	Howardite			
NWA 5209	Morocco	2007	224	1	Ureilite			Core 19.8
NWA 5211	Morocco	2007	276	1	CK			33.2
NWA 5212	Morocco	2007	181	1	CV3			1.2–52.8
NWA 5214	Morocco	2007	50.7	1	Martian			
NWA 5215	Morocco	2007	198	1	Eucrite			
NWA 5218	Erfoud	October 2007	76	1	Eucrite			
NWA 5219	Erfoud	October 2007	60	Several	Martian			
NWA 5220	Erfoud	October 2007	135	1	LL4–LL6			29.5
NWA 5221	Erfoud	October 2007	90	1	LL6			30.5
NWA 5222	Erfoud	October 2007	60	1	Howardite			
NWA 5402	Rissani	June 2008	189	1	Achondrite, ungrouped			28.8–30.5
NWA 5409	Denver	September 2006	97.5	1	EL4			
NWA 5410	Denver	September 2007	38	1	Lodranite			8
NWA 5421	Erfoud, Morocco	2008	2200	1	LL3.7			21.3 ± 8.5
NWA 5422	Erfoud, Morocco	2008	880	1	H4			16.7 ± 1.8
NWA 5423	Erfoud, Morocco	2008	1120	1	R3.8			37.4 ± 0.1
NWA 5424	Erfoud, Morocco	2008	579	1	L6			24.7 ± 0.2
NWA 5425	Erfoud, Morocco	2006	479	1	H4			17.3
NWA 5426	Erfoud, Morocco	2006	285	3	R4 polymict breccia			38.6 ± 0.4
NWA 5427	Erfoud, Morocco	2006	285	1	L3.8			23.9 ± 0.6

Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[1]	Type specimen mass (g)	Type specimen location	Main mass[2]	Comments
20.6	2.1		Bunch, *NAU*	25	*PSF*	*PSF*	
26	2.1		*NAU*/Birdsell/ Bunch	24.1	*NAU*		
29.1	3		Bunch and Wittke, *NAU*	10.4	*NAU*	Anon	
Core 15.9	0.9		Bunch, *NAU*	23	*NAU*	Aaronson	
7.9			Bunch, *NAU*	22	*NAU*	Aaronson	
50.3	2.1		Bunch, *NAU*	39	*NAU*	Curchin	Polymict breccia
			Wittke and Bunch, *NAU*	34	*NAU*	Cimala	
0.02–28.7			Bunch and Wittke, *NAU*	29	*NAU*	Cimala	
23–34	1.9–2.5		Bunch and Wittke, *NAU*	22	*NAU*	Aaronson	
Core 15.5	1.1		Bunch, *NAU*	21.3	*NAU*	Boswell	
27.3	0.6		Bunch, *NAU*	20.2	*NAU*	Gregory	
2.8–10.9			Bunch, *NAU*	20.4	*NAU*	*Gregory*	
36–5–56.8	12.3–16.0		Bunch, *NAU*	10.4	*NAU*	D. Pitt	Paired with NWA 2975
49.2–58.7	1.7–3.3		Bunch and Wittke, *NAU*; Irving, *UWS*	20.4	*NAU*	D. Pitt	
54.3–60	3.3–4.9		Bunch and Wittke, *NAU*	15	*NAU*	Cimala	
34.6–54.8	10.2–15.3		Bunch, *NAU*	12	*NAU*	Cimala	Paired with NWA 2975
24.5	2.1		Bunch, *NAU*	20.1	*NAU*	Cimala	Polymict breccia
24.8	2		Bunch, *NAU*	18.1	*NAU*	Cimala	
34.6	3.8		Wittke and Bunch, *NAU*	12	*NAU*	Cimala	
24.8	4		A. Irving, *UWS*	20.3	*UWS*	*GHupé*	Appears to be the product of almost complete melting of an LL chondrite precursor followed by crystallization. See written description
1.5	0.2		A. Irving, *UWS*	19.5	*UWS*	*AHupé*	Kamacite (0.45 wt% Si)
9	2.6		A. Irving, *UWS*	7.6	*UWS*	*AHupé*	Oxygen isotopes (D. Rumble, *CIW*): $\delta^{18}O = 2.724, 2.948$; $\delta^{17}O = 0.184, 0.340$ per mil
15.2–27.3	Not given		A. Rubin, *UCLA*	20	*UCLA*	*Morgan*	
15.1–18.6	1.5 ± 1.3		A. Rubin, *UCLA*	24	*UCLA*	*Morgan*	
37.2–37.5	Not given		A. Rubin, *UCLA*	20.3	*UCLA*	*Morgan*	
Not given	Not given		A. Rubin, *UCLA*	18	*UCLA*	*Morgan*	
16.2	1		A. Rubin, *UCLA*	10	*UCLA*	*Morgan*	
Not given	Not given		G. Huss, *UH*	20	*UH*	*Morgan*	
19.2 ± 1.75	Not given		G. Huss, *UH*	24	*UH*	*Morgan*	

Table 1. *Continued*. Meteorite finds from Northwest Africa.

Name	Location of recovery or purchase	Date of recovery or purchase	Total known mass (g)	Number of pieces	Class	Shock	Weathering grade	Fa mol%
NWA 5484	Erfoud	September 2008	328	1	Diogenite			
NWA 5717	Algeria	2008	7310	1	Chondrite ungrouped	S2	W1/2	9.7–20.8
NWA 5731	Erfoud, Morocco	December 2008	241.04	1	LL3.2			0.7–62.9
NWA 5732	Erfoud, Morocco	December 2008	99.98	1	CV3			0.5–66.2
NWA 5733	Talsint area, Morocco	December 2008	15.03	1	CK4			33.5 ± 0.2
NWA 5736	As-Sakn, Morocco	February 2009	127	1	CV3			0.4–50.6
NWA 5737	Algeria	February 2009	478	1	CV3			0.4–61.4
NWA 5767	El-Rashidia	2008	2100	1	L5			24.8
NWA 5768	Er-Rachidia	2008	118	1	LL5			29.8
NWA 5769	Ensisheim	2007	26	1	H6			20.6
NWA 5771	Alnif	2003	66.7	1	Ureilite			21.6 (cores)
NWA 5772	Alnif	2008	369	1	CV3			1.7–62.0
NWA 5773	Alnif	2008	1200	1	L5			24.6
NWA 5775	Morocco	2006	50000	1	LL5			25.7
NWA 5778	Denver	2008	1560	1	H4			19.6
NWA 5779	Morocco	2008	815	1	LL5			29.7
NWA 5780	Tucson	2007	2900	1	LL6			28.7
NWA 5781	Tucson	2009	1060	2	LL3.3			6.2 to 38
NWA 5782	Denver Mineral Show	September 2008	130	2	Acapulcoite (anon)			
NWA 5783	Tucson	2008	524	5	LL6			29.7
NWA 5789	Morocco	January 2009	49	1	Shergottite			15.6–16.6
NWA 5790	Erfoud	2009	145	2	Nakhlite			65
NWA 5795	Erfoud, Morocco	May 2006	196	1	CO3			0.4–50.4
NWA 5796	Erfoud, Morocco	July 2008	7211	13	H4			18.8 ± 0.4
NWA 5797	Erfoud, Morocco	2009	495	1	CM2			0.5–62.2

Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[1]	Type specimen mass (g)	Type specimen location	Main mass[2]	Comments
22.6	1.2		A. Irving, S. Kuehner, *UWS*	21.7	*UWS*	*Morgan*	Oxygen isotopes (D. Rumble, *CIW*): $\delta^{18}O$ = 3.456, 3.365; $\delta^{17}O$ = 1.616, 1.552 per mil
			Bunch and Wittke, *NAU*; Irving, *UWS*	40	*NAU*	*Pitt*	See written description
1.5–21.8	0.0–1.2		Chaumard and B. Devouard, *UBP*	20.11	*MNHNP*	*PThomas*	
1.52 ± 0.3	0.0–0.3		Chaumard and B. Devouard, *UBP*	20.58	*MNHNP*	*PThomas*	
10.8 ± 0.3	46.1 ± 1.6		Chaumard and B. Devouard, *UBP*	3.11	*MNHNP*	*PThomas*	
1.6 ± 0.7	0.0–32.5		Chaumard and B. Devouard, *UBP*	24.48	*MNHNP*	*PThomas*	
1.1–50.4	0.0–49.4		Chaumard and B. Devouard, *UBP*	20.5	*MNHNP*	*PThomas*	
21.8	2		Bunch, *NAU*	20.5	*FM*	*FM*	
24.7	1.8		Bunch, *NAU*	20	*FM*	*FM*	
18.4	1.9		Bunch, *NAU*	5.4	*FM*	*FM*	
17.6	10		Bunch, *NAU*	13.6	*FM*	*FM*	
5.5–17.3			Bunch, *NAU*	24.7	*FM*	*FM*	
20.7	2.1		Bunch, *NAU*	32.7	*FM*	*FM*	
22	1.8		Bunch, *NAU*	25	*FM*	*FM*	
17.9	1.6		Bunch, *NAU*	30.6	*FM*	*FM*	
24.8	1.9		Bunch, *NAU*	23	*FM*	*FM*	Polymict
24.3	1.8		Bunch, *NAU*	24.7	*FM*	*FM*	
13.4–26.6	2		Bunch, *NAU*	25.5	*FM*	*FM*	Olivine Cr_2O_3 = 0.12–0.38 wt%
8.7–13.3	Fs9.0–14.1		Bunch and Wittke, *NAU*	20.8	*NAU*	B. Reed	Polymict breccia, see written description
24.9	2		Bunch, *NAU*	22.6	*FM*	*FM*	
17.1	1.6		A. Irving, S. Kuehner, *UWS*	9.8+	*UWS*+	Anon	Olivine-phyric shergottite. See written description
24	40		Jambon, Boudouma, Badia, *UPVI*	20	*UPVI*, *UAb*, *UWS*	*Habibi*	See written description
1.4 ± 0.2	0.0–1.2		Chaumard and B. Devouard, *UBP*	20.133	*MNHNP*	Kuntz	
16.9 ± 0.2	1.0 ± 0.2		Chaumard and B. Devouard, *UBP*	20.5	*MNHNP*	Beroud	
1.4 ± 0.3	2.1 ± 1.9		Chaumard and B. Devouard, *UBP*	20.156	*MNHNP*	Ralew	

Table 1. *Continued.* Meteorite finds from Northwest Africa.

Name	Location of recovery or purchase	Date of recovery or purchase	Total known mass (g)	Number of pieces	Class	Shock	Weathering grade	Fa mol%
NWA 5798	Morocco	2007	20.245	1	CK4			32.8 ± 0.4
NWA 5802	Amgala/Oum Dreyga region of Morocco	May 2005	51.4	1	LL6 (fragmental breccia)			W1
NWA 5803	Morocco	April 2008	38.6	1	Eucrite (monomict)			Minimal
NWA 5805		February 2007	1880	1	Diogenite, polymict			30.6–61.2
NWA 5806		March 2008	33.5	1	Diogenite			95.5–99.6
NWA 5807			50	1	H3		W1	8.3–23.6
NWA 5808	Morocco		730	1	H3.15		W1	7.8–20.4
NWA 5809	Morocco/Algeria	2001	734	1	H/L 5		W3	20.2–21.1 av. 20.7
NWA 5810	Morocco	January 2006	1130	1	H4		W1–2	16.7–18.1
NWA 5811	Morocco	August 22, 2008	360	1	L4		W4	24.6–27.6
NWA 5812	Morocco/Algeria	2001	1173	1	L4		W1	23.9–26.6
NWA 5813	Morocco	Spring 2006	1363	1	L4	S1	W2	22.2–25.6
NWA 5814	Morocco	February 2006	995	1	L/LL3–5	S 2/4	W1	24.4–33.6
NWA 5815	Algeria/Morocco		256.8	1	L5	S4	W1	24.6–27.8
NWA 5816	Algeria	July 2006	70.1	1	L5	S6	W1	25.0–27.8
NWA 5817	Algeria/Morocco	July 2006	83.4	1	L5		W1	22.6–23.7
NWA 5818	Algeria/Morocco	July 2006	1293	1	L5		W1	24.6–26.4
NWA 5819	Morocco		147	1	L4	S6	W1	24.2–29.1
NWA 5820	NWA	November 2008	66	1	LL6	S1	W1	30.9–31.8
NWA 5821	Algeria/Morocco	2007	264	1	H3	S1	W3	
NWA 5822	NWA	June 2007	494	1	H4		W2	
NWA 5823	Morocco	March 2008	780		H4		W1	
NWA 5824		January 2007	12000	Several	H4		W1	
NWA 5825	Morocco/Algeria	2001	3237	1	H5		W1–2	
NWA 5826	NWA	June 2007	755	1	H5		W1–2	
NWA 5827	NWA	June 2007	267	1	H5		W3	
NWA 5828	Morocco		2799	1	H5		W1	
NWA 5829	Mauretania	March 2008	990	1	H5		W1	
NWA 5830	Morocco	March 2008	186		H5		W2	
NWA 5831	Morocco	March 2008	76		H5		W1	
NWA 5832	Morocco	March 2008	39.2		H5		W3	
NWA 5833	Morocco	April 2009	84	1	H5		W0–1	
NWA 5834		November 2008	158	1	H5		W1	
NWA 5835	Sahara	August 02, 2008	214.96	1	H6		W2	

Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[1]	Type specimen mass (g)	Type specimen location	Main mass[2]	Comments
27.6 ± 0.2	0.6 ± 0.2		Chaumard and B. Devouard, *UBP*	4.065	*MNHNP*	Hmani	
27.1 ± 0.7	22.7 ± 0.6	1.5 ± 0.3	C. Herd, *UAb*	14.9	*UAb*	*UAb*	Purchased by B. Chatterton (*UAb*) from a dealer in Erfoud, Morocco
n/a	43 ± 1	2.3 ± 0.5	C. Herd and D. Lake, *UAb*	8.9	*UAb*	Luc Labenne	Acquired from a nomad in South Morocco. Consists of mm-scale clasts of pyroxene and plagioclase in a groundmass of the same. Accessory chromite and FeS. Low-Ca pyroxene contains about 30 μm augite lamellae of ($Fs^{17}Wo^{43}$). Plagioclase is $An_{93}Or_0$. Monomict cumulate eucrite breccia
2.94		2.94	*Barto1*	20.0	*Kiel*	Haiderer	$An_{93-95}Or_{<0.1}$; kamacite Ni 2.4–5.3, Co 0.7–1.0
3.71		3.71	*Barto1*	6.6	*Kiel*	Anon	
3.6–24.6		4.81	*Barto1*	10.0	*Kiel*	Barto	
2.4–17.4		5.15	*Barto1*	20.2	*Kiel*	Anon	Olivine: Cr_2O_3 0.14, s-Cr_2O_3 0.23 (wt%); breccia
17.5–18.2		4.95	*Barto1*	20.0	*Kiel*	Anon	
9.8–16.9		4.82	*Barto1*	23.8	*Kiel*	Barto	Melt pools
20.6–22.5		4.62	*Barto1*	20.8	*Kiel*	Coll. Knöfel	An_9Or_{2-8}
4.0–22.7		4.71	*Barto1*	20.3	*Kiel*	Anonymous	Breccia
7.8–22.9		4.58	*Barto1*	20.0	*Kiel*	Anonymous	
15.6–22.8		4.84	*Barto1*	20.0	*Kiel*	Wengert	Genomict breccia
20.6–23.3		4.68	*Barto1*	19.9	*Kiel*	Barto	Breccia
20.7–24.9		4.61	*Barto1*	16.3	*Kiel*	Barto	Impact melt veins, ringwoodite, maskelynite
8.9–20.1		4.47	*Barto1*	16.9	*Kiel*	Barto	
20.6–21.7		4.42	*Barto1*	20.4	*Kiel*	Barto	Melt pools and veins
20.9–23.1		4.32	*Barto1*	20.3	*Kiel*	Anon	Breccia, melt veins, maskelynite, ringwoodite
25.5–26.1		3.40	*Barto1*	13.5	*Kiel*	Anon	$En_{44}Wo_{40}$; $An_{33}Or_2$; breccia
		4.90	*Barto2*	20.0	*Kiel*	Bilet	
		4.87	*Barto2*	24.3	*Kiel*	Barto	
		5.25	*Barto2*	20.3	*Kiel*	Anon	
		5.02	*Barto2*	20.0	*Kiel*	Anon	Breccia
		5.21	*Barto2*	20.4	*Kiel*	Anon	Melt pools and veins
		5.20	*Barto2*	20.5	*Kiel*	Barto	Shock veins
		4.85	*Barto2*	20.4	*Kiel*	Barto	
		5.09	*Barto2*	22.4	*Kiel*	Anon	
		5.39	*Barto2*	23.9	*Kiel*	Anon	
		5.04	*Barto2*	19.8	*Kiel*	Anon	
		5.11	*Barto2*	17.5	*Kiel*	Anon	
		4.82	*Barto2*	7.8	*Kiel*	Anon	
		5.31	*Barto2*	17.0	*Kiel*	Anon	
		4.97	*Barto2*	20.0	*Kiel*	Anon	Breccia
		5.20	*Barto2*	21.5	*Kiel*	Coll. Knöfel	

Table 1. *Continued*. Meteorite finds from Northwest Africa.

Name	Location of recovery or purchase	Date of recovery or purchase	Total known mass (g)	Number of pieces	Class	Shock	Weathering grade	Fa mol%
NWA 5836	NWA	June 2007	1459	1	H6		W0	
NWA 5837	NWA	June 2007	612	1	H6		W0	
NWA 5838	NWA		1438.7	1	H6		W1	
NWA 5839	Algeria/Morocco	2006	6500	1	H6		W2	
NWA 5840	Sahara	July 27, 2008	33.76	1	L4		W2	
NWA 5841	NWA	June 2007	322	1	L4		W2	
NWA 5842	NWA	June 2007	227	1	L4		W4	
NWA 5843	NWA	June 2007	439	1	L4		W4	
NWA 5844	Morocco		1000		L5		W0–1	
NWA 5845	Morocco		3000		L5		W1	
NWA 5846	NWA	November 2008	44	1	L5		W2	
NWA 5847	NWA	November 2008	300	1	L5		W0–1	
NWA 5848	Morocco	August 22, 2008	45.6	1	L6		W0–1	
NWA 5849	Morocco/Algeria	2001	3230	1	L6		W2	
NWA 5850	Morocco/Algeria	2001	1267	1	L6		W1	
NWA 5851	Morocco	April 2008	13.3	1	L6		W1	
NWA 5852	Algeria/Morocco		293	1	L6		W4	
NWA 5853	Algeria/Morocco		74.5	1	L6		W1	
NWA 5854	NWA	June 2007	73.7	1	L6		W0	
NWA 5855	NWA	June 2007	309	1	L6		W1	
NWA 5856	NWA	June 2007	416	1	L6		W2	
NWA 5857	NWA	June 2007	156	1	L6		W4	
NWA 5858	NWA	June 2007	40.5	1	L6		W2	
NWA 5859	Morocco	Spring 2006	802	1	L6		W2	
NWA 5860	Morocco	Spring 2006	555	1	L6		W1	
NWA 5861	Morocco	March 05, 2008	1965	10	L6		W1	
NWA 5862	Morocco	May 2009	6.9	1.0	L6		W1	
NWA 5863	Morocco	May 2009	7.5	1	L6		W1	
NWA 5864	Algeria/Morocco	February 2006	353	1	L6		W1	
NWA 5865	Algeria/Morocco	2006	309	1	L6		W1	
NWA 5866	Morocco	March 2008	380		L6		W1	
NWA 5867	Morocco	March 2008	74.1		L6		W3	
NWA 5868	Morocco	March 2008	8000		L6		W1	
NWA 5869	Morocco	April 2009	157	1	L6			
NWA 5870		December 2006	65	1	L6		W1	
NWA 5871		November 2008	290	1	L6		W2	
NWA 5872	Algeria/Morocco	May 2006	387	11	L/LL 4		W2	
NWA 5873	Morocco	April 2009	575	1	L/LL 6		W1	
NWA 5874	NWA	June 2007	232	1	LL4		W1–2	
NWA 5875	NWA	June 2007	376	1	LL5		W1	
NWA 5876	Algeria/Morocco	November 2006	69	1	LL6		W1	
NWA 5877	Algeria/Morocco	November 2006	71	1	LL6		W1	
NWA 5878	Morocco	March 2008	1650		LL6		W1	
NWA 5879	NWA	November 2008	70	1	LL6		W1–2	
NWA 5880	Morocco	April 2009	261	1	LL6		W2	
NWA 5881	Morocco	April 2009	196	1	LL6		W2	
NWA 5882	Western Sahara	2009	44	1	LL6		W0–1	
NWA 5883	Algeria/Morocco	2007	360	1	LL4		W0–1	
NWA 5960	Mali	August 2009	147	1	Shergottite			25.4

Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[1]	Type specimen mass (g)	Type specimen location	Main mass[2]	Comments
		5.53	*Barto2*	21.1	*Kiel*	Barto	
		5.28	*Barto2*	21.9	*Kiel*	Barto	
		4.90	*Barto2*	20.3	*Kiel*	Anon	
		5.02	*Barto2*	20.0	*Kiel*	Vettori	
		4.75	*Barto2*	6.7	*Kiel*	Coll. Knöfel	
		4.63	*Barto2*	25.3	*Kiel*	Barto	
		4.43	*Barto2*	20.0	*Kiel*	Barto	
		4.65	*Barto2*	28.6	*Kiel*	Barto	
		4.98	*Barto2*	20.0	*Kiel*	Anon	Melt vein
		4.85	*Barto2*	20.0	*Kiel*	Anon	
		4.86	*Barto2*	9.0	*Kiel*	Anon	
		4.78	*Barto2*	20.0	*Kiel*	Anon	Breccia, impact melt pools
		4.94	*Barto2*	9.9	*Kiel*	Coll. Knöfel	
		4.68	*Barto2*	21.0	*Kiel*	Anon	
		4.90	*Barto2*	21.4	*Kiel*	Anon	Melt veins
		4.75	*Barto2*	2.6	*Kiel*	Coll. Knöfel	
		4.42	*Barto2*	20.0	*Kiel*	Barto	
		4.72	*Barto2*	16.7	*Kiel*	Barto	
		4.87	*Barto2*	15.4	*Kiel*	Barto	
		4.55	*Barto2*	23.4	*Kiel*	Barto	
		4.79	*Barto2*	20.1	*Kiel*	Barto	
		4.42	*Barto2*	20.2	*Kiel*	Barto	
		4.80	*Barto2*	11.1	*Kiel*	Barto	
		4.69	*Barto2*	20.5	*Kiel*	Anon	Melt pools
		4.94	*Barto2*	21.0	*Kiel*	Anon	Melt vein
		5.00	*Barto2*	20.0	*Kiel*	Anon	
		4.65	*Barto2*	1.4	*Kiel*	Anon	Melt veins
		4.73	*Barto2*	1.5	*Kiel*	Anon	
		4.88	*Barto2*	20.3	*Kiel*	Neu	
		4.75	*Barto2*	27.2	*Kiel*	Lüdtke	
		4.51	*Barto2*	20.4	*Kiel*	Anon	
		4.46	*Barto2*	14.8	*Kiel*	Anon	
		4.77	*Barto2*	19.9	*Kiel*	Anon	
		4.36	*Barto2*	20.0	*Kiel*	Anon	
		4.40	*Barto2*	13.0	*Kiel*	Anon	Breccia with melt veins
		4.60	*Barto2*	20.0	*Kiel*	Anon	Breccia
		4.32–4.58	*Barto2*	21.3	*Kiel*	GiPo	Magnetic susceptibility intermediate between L and LL
		4.58	*Barto2*	20.0	*Kiel*	Anon	Magnetic susceptibility intermediate between L and LL
		4.37	*Barto2*	20.4	*Kiel*	Barto	
		4.44	*Barto2*	24.8	*Kiel*	Barto	
		4.31	*Barto2*	14.0	*Kiel*	Neu	
		4.21	*Barto2*	14.5	*Kiel*	Neu	
		4.31	*Barto2*	20.1	*Kiel*	Anon	
		4.27	*Barto2*	14.0	*Kiel*	Anon	
		3.29	*Barto2*	20.0	*Kiel*	Anon	
		3.24	*Barto2*	20.0	*Kiel*	Anon	Breccia
		3.85	*Barto2*	8.8	*Kiel*	Anon	
		4.42	*Barto2*	20.0	*Kiel*	Bilet	
31.2–38.7	5.1–12.5		Irving and Kuehner, *UWS*	20	*UWS*	Anon	See written description

Table 1. *Continued*. Meteorite finds from Northwest Africa.

Name	Location of recovery or purchase	Date of recovery or purchase	Total known mass (g)	Number of pieces	Class	Shock	Weathering grade	Fa mol%
NWA 5962	Midelt, Morrocco	July 2004	3400	1	L6			24.2 ± 0.5
NWA 5963	Midelt, Morrocco	July 2004	8200	1	L5			24.2 ± 0.3
NWA 5964	Tucson Gem Show	February 2004	105	1	L3–6			Host-24.2 ± 0.5 melt-15.0 ± 4.3
NWA 5966	Purchased at Tucson Mineral Show from a Moroccan mineral dealer	January 31, 2007	83	1	CV3oxA			0.3–36.2 (ave. 7.4) for phenocryst; 33.3–56.5 (50.3) for matrix
NWA 5990	Morocco	July 2009	59	1	Shergottite			40.7

A key to abbreviations for addresses used in the table can be found at our web site, http://tin.er.usgs.gov/meteor/MetBullAddresses.php .
New abbreviations are given below:
Barto1 = Electron microprobe: R. Bartoschewitz, P. Appel, B. Mader, *Kiel*; *Barto2* = Magnetic susceptibility: R. Bartoschewitz; *Barto3* = Microprobe: R. Bartoschewitz, P. Appel, B. Mader at Univ. Kiel; O-isotopes: Kusakabe M., Inst. for Study of the Earth's Interior; *Barto4* = R. Bartoschewitz, P. Appel, B. Mader at Univ. Kiel; O-isotopes: I. A. Franchi and R. C. Greenwood, Open Univ. Milton Keyns; *NSM* = National Science Museum 3-23-1 Hyakunin-cho, Shinjuku-ku, Tokyo, Japan; *VI* = Vernadsky Institut Moscow; *TUBS* = Mineralienkabinett Technische Universität Braunschweig (Brunsvik).

Table 2. Meteorites from North America.

Name	Location of recovery	Type of find site	Date of recovery	Find/ Fall	Latitude	Longitude	Total known mass (g)	Number of pieces	Class	Shock stage
Big Horn Mountains	Maricopa County, Arizona, USA		March 01, 2006	Find	33°42.800N	113°16.500W	91.9	1	H4	S2
Cargo Muchacho Mountains	Imperial County, Calif., USA	Gravel/ clay	May 2000	Find	32°55.047N	114°46.031W	2860	35	CO3	S1
Grimsby	Ontario, Canada		September 2009	Fall	4312′N	7937′W	215	13	H5	S2
Jungo 001	Humboldt County, Nevada, USA		October 09, 2007	Find	40°53.433N	118°21.767W	70.7	1	L6	S4
Jungo 002	Humboldt County, Nevada, USA		October 09, 2007	Find	40°53.883N	118°21.233W	27.8	1	H6	S4
Jungo 003	Humboldt County, Nevada, USA		October 09, 2007	Find	40°57.483N	118°21.183W	29.1	1	H6	S4
Larned	Kansas, USA		1977	Find	38°11.97′N	99°9.72′W	28100	1	Aubrite, anomalous	
Tungsten Mountain 011	Churchill County, Nevada, USA	Dry Lake	August 19, 2003	Find	39°41′N	117°37′W	186.52	4	CV3	S2
Wood Lake	Ontario, Canada		July 2003	Find	4500′N	7904′W	350	1	H4	S3

A key to abbreviations for addresses used in the table can be found at our web site, http://tin.er.usgs.gov/meteor/MetBullAddresses.php.
New abbreviations are given below:
Bernardes = Prof. Eduardo Bernardes—Departamento de Geologia, UFBA/M. E. Zucolotto, Rio.
[1]Name and institution of classifier.
[2]Location or holder of the main mass.

Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[1]	Type specimen mass (g)	Type specimen location	Main mass[2]	Comments
n.d.			M. Hutson, *Cascadia*	52.9	*Cascadia*	Carr	
n.d.			M. Hutson, *Cascadia*	46.3	*Cascadia*	Carr	
n.d.			M. Hutson, A. Ruzicka, K. Hauver *Cascadia*	94.3	*Cascadia*	*Cascadia*	Has a large shock melt clast, large recrystallized clasts, coarse grained igneous clasts
0.4–9.5 (2.2)	0.3–7.5 (1.4)		Y. Tsuboya and M. Kimura (Ibaraki Univeristy)	18.0 g	*NSM*	Hori Mineralogy	CAIs are common. Matrix abundance is about 50%. Nepheline, magnetite and metal and sulfide are abundant. Phyllosilicate is absent
28.3–33.1	7.8–12.5		Irving and Kuehner, *UWS*	11.8	*UWS*	Anon	See written description.

Weathering grade	Fa mol%	Fs mol%	Wo mol%	Magnetic sus logχ (10^{-9} m^3 kg^{-1})	Classifier(s)[1]	Type specmen mass (g)	Type specimen location	Main mass[2]	Comments
W2/W4	18.5 ± 0.3	16.3 ± 0.4	1.4 ± 0.3		Hutson, *Cascadia*	23.3	*Cascadia*	*Sloan*	Bimodal weathering
W3	6.0 ± 7.5				Rubin, *UCLA*	139	*UCLA*	*Sajkowicz*	
W0–1	17.8 ± 0.4, *n* = 8	15.0 ± 1.0, *n* = 5			P. McCausland, *UWO*	22	*UWO*	*Farmer*	See written description
W2	24.3 ± 0.2				Hutson, *Cascadia*	16.8	*Cascadia*	*Dyer*	
W3	19.3 ± 0.4				Hutson, *Cascadia*	11.2	*Cascadia*	*Dyer*	Distinct sulf texture—paired with Jungo 003
W3	19.1 ± 0.5				Hutson, *Cascadia*	12.9	*Cascadia*	*Dyer*	Distinct sulf texture—paired with Jungo 002
	0.1–0.2	0.4–1.1			Irving and Kuehner, *UWS*	190	*UWS*	Dr. D. Stimpson	See written description.
W3	7.3–23.3				Rubin, *UCLA*	21.7	*UCLA*	Nicholas Gessler	21.7 g to *UCLA* (1.07, 6.24 and 14.39 from 3 pieces). 164.83 g with Nicholas Gessler (18.41 and 146.42 from 2 pieces).
W1	18.3 ± 0.9, *n* = 28	17.5 ± 2.6, *n* = 16	35.2 ± 2.2, *n* = 3	5.17	P. McCausland, *UWO*	85	*UWO*	*Sansom*	Fusion encrusted stone

Table 3. Meteorites from South America.

Name	Location of recovery	Date of recovery	Find/Fall	Latitude	Longitude	Total known mass (g)	Number of pieces	Class	Shock stage	Weathering grade
Nahuel Niyeu	Rio Negro Province, Argentina	Feb 28, 2005	Find	40°32′S	66°38′W	10540	1	H5	S2	W2/3
San Juan 013	Antofagasta, Chile	Oct 10, 2008	Find	25°35′S	69°47′W	145.0	1	L3	S3	W1
San Juan 014	Antofagasta, Chile	Oct 10, 2008	Find	25°35′S	69°47′W	134.0	1	L6	S3	W3
San Juan 015	Antofagasta, Chile	Oct 10, 2008	Find	25°35′S	69°47′W	349.0	1	L6	S3	W3
San Juan 016	Antofagasta, Chile	Oct 11, 2008	Find	25°35′S	69°47′W	116.0	1	H5	S2	W2
San Juan 017	Antofagasta, Chile	Oct 11, 2008	Find	25°35′S	69°47′W	56.4	1	H6	S2	W3
San Juan 018	Antofagasta, Chile	Oct 11, 2008	Find	25°35′S	69°47′W	17.2	1	L5	S3	W1
San Juan 019	Antofagasta, Chile	Oct 11, 2008	Find	25°35′S	69°47′W	181.0	2	L6	S3	W2
San Juan 020	Antofagasta, Chile	Oct 12, 2008	Find	25°35′S	69°47′W	151.0	1	H5	S3	W3
San Juan 021	Antofagasta, Chile	Oct 12, 2008	Find	25°35′S	69°47′W	174.0	1	H4	S1	W3
San Juan 022	Antofagasta, Chile	Oct 12, 2008	Find	25°35′S	69°47′W	86.3	1	L6	S4	W1
San Juan 023	Antofagasta, Chile	Oct 12, 2008	Find	25°35′S	69°47′W	539.0	1	H5	S3	W2
San Juan 024	Antofagasta, Chile	Oct 12, 2008	Find	25°35′S	69°47′W	15.2	1	L6	S3	W1
San Juan 025	Antofagasta, Chile	Oct 17, 2008	Find	25°35′S	69°47′W	419.0	1	H5	S3	W2
San Juan 026	Antofagasta, Chile	Oct 18, 2008	Find	25°35′S	69°47′W	307.0	1	L6	S1	W2
San Juan 027	Antofagasta, Chile	Oct 18, 2008	Find	25°35′S	69°47′W	199.0	1	H3–5	S2	W3
San Juan 028	Antofagasta, Chile	Oct 18, 2008	Find	25°35′S	69°47′W	151.0	1	H5	S3	W1

Fa mol%	Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[a]	Type specmen mass (g)	Type specimen location	Main mass[b]	Comments
18.4 ± 0.2	16.0 ± 0.2	1.3 ± 0.2		Hutson	35.6	*Cascadia*	Jawerbaum	
24.58 ± 1.07	13.56 ± 8.19		4.73	J. Gattacceca *and* M. Uehara, *CEREGE*	35	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
24.38 ± 0.20	20.31 ± 0.22		4.38	J. Gattacceca *and* M. Uehara, *CEREGE*	45	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
24.62 ± 0.23	20.50 ± 0.28		4.56	J. Gattacceca *and* M. Uehara, *CEREGE*	88	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
18.28 ± 0.11	16.25 ± 0.21		5.16	J. Gattacceca *and* M. Uehara, *CEREGE*	20	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
18.73 ± 0.15	16.78 ± 0.36		4.91	J. Gattacceca *and* M. Uehara, *CEREGE*	15	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
2.,02 ± 0,47	20.21 ± 0.15		4.82	J. Gattacceca *and* M. Uehara, *CEREGE*	5	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
24.41 ± 0,28	21.17 ± 0.54		4.65	J. Gattacceca *and* M. Uehara, *CEREGE*	46	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
18.16 ± 0,30	16.14 ± 0.24		4.98	J. Gattacceca *and* M. Uehara, *CEREGE*	46	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
18.50 ± 0,31	16.19 ± 0.31		4.94	J. Gattacceca *and* M. Uehara, *CEREGE*	37	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
23.94 ± 0,49	21.52 ± 1.17		4.43	J. Gattacceca *and* M. Uehara, *CEREGE*	23	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
18.95 ± 0,24	16.53 ± 0.23		5.23	J. Gattacceca *and* M. Uehara, *CEREGE*	112	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
24.14 ± 0,18	2038 ± 0.33		4.66	J. Gattacceca *and* M. Uehara, *CEREGE*	4	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
18.27 ± 0,34	15.54 ± 0.25		5.19	J. Gattacceca *and* M. Uehara, *CEREGE*	81	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
24.69 ± 0,26	20.64 ± 0.24		4.44	J. Gattacceca *and* M. Uehara, *CEREGE*	56	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
9.35 ± 8.24– 18.59 ± 0.19	12.99 ± 5.78– 16.74 ± 0.16		4.98	J. Gattacceca *and* M. Uehara, *CEREGE*	63	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	Shock stage determined for H3 lithology only
17.87 ± 0.55	15.32 ± 0.54		5.29	J. Gattacceca *and* M. Uehara, *CEREGE*	45	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	

Table 3. *Continued*. Meteorites from South America.

Name	Location of recovery	Date of recovery	Find/ Fall	Latitude	Longitude	Total known mass (g)	Number of pieces	Class	Shock stage	Weathering grade
San Juan 029	Antofagasta, Chile	Oct 18, 2008	Find	25°35′S	69°47′W	399.0	1	H3	S1	W3
San Juan 030	Antofagasta, Chile	Oct 18, 2008	Find	25°35′S	69°47′W	25.5	1	H5	S3	W1
San Juan 031	Antofagasta, Chile	Oct 18, 2008	Find	25°35′S	69°47′W	218.0	1	L3	S3	W0/1
San Juan 032	Antofagasta, Chile	Oct 18, 2008	Find	25°35′S	69°47′W	28.8	1	H5/6	S3	W2
Santa Lucia (2008)	San Juan, Argentina	Jan 23, 2008	Fall	31°32′08″S	68°29′22″W	4000	Several	L6	Weak	W0

[a]Name and institution of classifier.
[b]Location or holder of the main mass.
A key to abbreviations for addresses used in the table can be found at our website, http://tin.er.usgs.gov/meteor/MetBullAddress

Table 4. Approved meteorite names and relevant data for recoveries from the 2008 and 2009 field seasons of KOREAMET.

Name	Abbeviation	Location	Date	Lat. (S)	Long (W)	Mass (g)
Thiel Mountains 07001	TIL 07001	Bermel Escarpment	Dec 24, 2007	85°14.01′S	90°26.24′W	1865
Thiel Mountains 07002	TIL 07002	Moulton Escarpment	Dec 29, 2007	85°09.54′S	94°36.96′W	222
Thiel Mountains 07004	TIL 07004	Moulton Escarpment	Dec 29, 2007	85°09.42′S	94°35.80′W	32
Thiel Mountains 07005	TIL 07005	Moulton Escarpment	Dec 29, 2007	85°09.95′S	94°47.51′W	152
Thiel Mountains 07006	TIL 07006	Moulton Escarpment	Dec 29, 2007	85°10.03′S	94°40.51′W	370
Thiel Mountains 07010	TIL 07010	Moulton Escarpment	Dec 29, 2007	85°09.88′S	94°43.27′W	119
Thiel Mountains 07011	TIL 07011	Moulton Escarpment	Dec 30, 2007	85°10.17′S	94°46.95′W	19
Thiel Mountains 07013	TIL 07013	Moulton Escarpment	Dec 30, 2007	85°09.94′S	94°41.03′W	396
Thiel Mountains 07015	TIL 07015	Mt. Walcott	Jan 2, 2008	85°20.88′S	87°13.80′W	96
Thiel Mountains 08001	TIL 08001	Bermel Escarpment	Dec 17, 2008	85°14.44′S	90°21.06′W	44
Thiel Mountains 08002	TIL 08002	Bermel Escarpment	Dec 17, 2008	85°14.34′S	90°19.56′W	44
Thiel Mountains 08003	TIL 08003	Bermel Escarpment	Dec 17, 2008	85°14.65′S	90°20.69′W	65
Thiel Mountains 08005	TIL 08005	Mt. Wrather	Dec 25, 2008	85°23.22′S	87°06.95′W	511
Thiel Mountains 08006	TIL 08006	Moulton Escarpment	Dec 28, 2008	85°09.94′S	94°44.66′W	112
Thiel Mountains 08008	TIL 08008	Moulton Escarpment	Dec 29, 2008	85°10.54′S	94°44.71′W	34

Type specimens are in Seoul National University, main masses are in Korea Polar Research Institute. Classified by B.-G. Choi & A. E. Rubin.

Fa mol%	Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[a]	Type specmen mass (g)	Type specimen location	Main mass[b]	Comments
18.10 ± 9.30	12.50 ± 4.08		4.93	J. Gattacceca *and* M. Uehara, *CEREGE*	60	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
18.71 ± 0.37	16.27 ± 0.25		5.24	J. Gattacceca *and* M. Uehara, *CEREGE*	9	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
24.13 ± 0.96	17.75 ± 2.79		4.98	J. Gattacceca *and* M. Uehara, *CEREGE*	62	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
18.91 ± 0.08	16.56 ± 0.23		5.27	J. Gattacceca *and* M. Uehara, *CEREGE*	10	*CEREGE*	Depto. Geología, U. de Chile, Santiago, Chile.	
24.4	20.7	1.5		Brandstätter, *NHMV and* Varela*, CASLEO*	20	NHMV	Anon	A mass of 1526 g is at the *La Plata Museum (La Plata, Argentina)* and a mass of 354 g is kept at *CASLEO*

No. of pieces	Type	Shock	Weathering	Fa (mol%)	Fs (mol%)	Type spec. mass	$\delta^{18}O$	$\delta^{17}O$	$\Delta^{17}O$
1	H6	S1	W1	18.3	16.2	402	3.72	2.66	0.70
1	L5	S3	W1	24.2	20.2	15.9	4.57	3.40	0.99
1	H6	S2	W1	17.3	17.2	9.3	3.48	2.35	0.52
1	H6	S2	W1	18.1	16.2	37.4	3.82	2.59	0.58
1	L5	S3	W1	23.7	20.6	63.4	4.50	3.32	0.95
1	L5	S3	W1	24.1	20.2	16.7	4.96	3.67	1.09
1	H6	S2	W1	18.1	17.6	5.1	3.91	2.58	0.55
1	L5	S2	W1	24.4	20.9	55.8	4.84	3.38	0.86
1	H6	S1	W1	18.8	16.7	8.84	4.11	2.83	0.66
1	L6	S3	W1	23.9		17.3	4.67	3.66	1.20
1	H5	S1	W2	18		23.2	3.02	2.33	0.76
1	L6	S3	W1	24.2		19.6	4.60	3.63	1.20
1	H5	S1	W2	17.5		85.4	4.23	2.94	0.71
1	H5	S3	W2	17.8		21.2	4.37	3.11	0.81
1	H6	S3	W1	18.1		8.8	3.28	2.47	0.74

Table 5. Meteorites from Asia.

Name	Abbreviation	Location of recovery	Date of recovery	Find/Fall	Latitude	Longitude	Total known mass (g)	Number of pieces	Class	Shock stage
Alaer 001		Xinjiang, China	Jan 2007	Find	~40°20′N	~81°15′E	1.7	1	LL5	S2
Alaer 002		Xinjiang, China	Jan 2007	Find	~40°20′N	~81°15′E	1.1	1	LL5	S2
Dhofar 1479		Oman	July 2003	Find	18º12.15′N	54º03.10′E	132	1	H5/6	S2
Dhofar 1526	Dho 1526	Oman		Find	19°34.053′N	54°57.249′E	71.1	1	H4	S2
Digor		Turpan (Turfan) Prefecture, Shanshan (Piqan) County, China	2006	Find	~42°20′N	~89°20′E	3800	1	IIIAB	
Jarud Qi		Inner Mongolia, Tongliao Count, China	2000	Find	~44°37′N	~120°56′E	452	1	L5	S2
Jiddat al Harasis 479	JaH 479	Oman	2008	Find	19°47.139′N	55°51.21′E	553	1	Basaltic shergottite	
Jiddat al Harasis 480	JaH 480	Oman	Feb 12, 2008	Find	N19°58′16.8″	E56°25′48.2″	21.7	1	H5	S1
Jiddat al Harasis 481	JaH 481	Oman	Feb 12, 2008	Find	N19°58′16.8″	E56°25′48.2″	3.8	1	Mesosiderite	Low
Jiddat al Harasis 482	JaH 482	Oman	Feb 12, 2008	Find	N19°58′30.9″	E56°25′42.2″	31.9	1	Mesosiderite	Low
Jiddat al Harasis 483	JaH 483	Oman	Feb 12, 2008	Find	N19°58′43.5″	E56°25′09.8″	2.9	1	Mesosiderite	Low
Jiddat al Harasis 484	JaH 484	Oman	Feb 12, 2008	Find	N19°58′44.1″	E56°25′55.0″	5.8	1	H6	S1
Jiddat al Harasis 485	JaH 485	Oman	Feb 13, 2008	Find	N19°58′40.0″	E56°25′25.0″	40.5	1	Mesosiderite	Low
Jiddat al Harasis 486	JaH 486	Oman	Feb 13, 2008	Find	N19°58′31.1″	E56°25′18.9″	15.8	1	Mesosiderite	Low
Jiddat al Harasis 487	JaH 487	Oman	Feb 13, 2008	Find	N19°58′32.4″	E56°25′04.8″	5.9	1	H6	S2
Jiddat al Harasis 488	JaH 488	Oman	Feb 13, 2008	Find	N19°58′05.7″	E56°24′54.5″	22	1	H3	S2
Jiddat al Harasis 489	JaH 489	Oman	Feb 13, 2008	Find	N19°58′07.9″	E56°25′00.4″	30.9	1	Mesosiderite	Low
Jiddat al Harasis 490	JaH 490	Oman	Feb 13, 2008	Find	N19°58′36.6″	E56°24′39.9″	8	1	H6	S2
Jiddat al Harasis 491	JaH 491	Oman	Feb 13, 2008	Find	N19°58′50.0″	E56°24′43.4″	43	1	H4/5	S2
Jiddat al Harasis 492	JaH 492	Oman	Feb 14, 2008	Find	N19°58′53.3″	E56°25′02.8″	325	3	Mesosiderite	Low
Jiddat al Harasis 496	JaH496	Oman	Mar 6, 2007	Find	19°47.142′N	56°24.810′E	254.4	1	L6	S2
Jiddat al Harasis 497	JaH 497	Oman	Mar 6, 2007	Find	19°47.488′N	56°24.881′E	36.9	1	L6	S4
Jiddat al Harasis 498	JaH 498	Oman	Mar 6, 2007	Find	19°47.531′N	56°24.586′E	59.5	1	L6	S4
Jiddat al Harasis 499	JaH 499	Oman	Mar 6, 2007	Find	19°46.793′N	56°24.805′E	606.4	10	L6	S2
Jiddat al Harasis 501	JaH 501	Oman	Mar 12, 2007	Find	19°45.188′N	56°18.548′E	6751.4	24	H5	S2

Weathering grade	Fa mol%	Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[a]	Type specmen mass (g)	Type specimen location	Main mass[b]	Comments
				4.37	Barto, Li B.	0.3	*PMO, Nanjing*	*Li, Bofang*	Nearly complete individual
				4.57	Barto, Li B.	0.2	*PMO, Nanjing*	*Li, Bofang*	Part individual
W3/4	18.8 ± 0.5	16.8 ± 0.3		4.71	Bourot-Denise, MNHNP	20.9	*MNHN*	*L. Labenne*	
W2	16.1	14.8	0.8		E. Gnos, B. Hofmann	71.1	*NMBE*	*NMBE*	Finders A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
					Barto, Li B.	20	*BP, Beijing*	*Bart*	Ni 7.71%; Co 0.49%, Ga 20.5, Ge 30.0, As 4.08, W 1.2, Ir 15.5, Cu 188, Au 0.543 ppm.
W0/1	24.9	20.8		4.87	Barto, Li B.	20	*PMO, Nanjing*	*Bart*	An10.4–20.2Or5.3–9.5/ kamacite Ni 6.5–7.3, Co 0.9–1.4/taenite Ni 21.3–30.5, Co 0.42–0.69/ chromite Al2O3 6.5–5.6, TiO_2 2.5–2.6, MgO 2.4–5.8%. Possibly several pieces..
		28.1–47.4	12–19.9		M.A. Ivanova, C.A. Lorenz,	25.7	*Vernad*	*Anon*	(Franchi I.A. *OU*) $\delta^{17}O$ = 2.951 ‰, $\delta^{18}O$ = 5.070 ‰, $\Delta^{17}O$ = 0.315 ‰. See witten description
W3	18	16.1			A. Greshake, *MNB*	6.7	*MNB*	*Anon*	
Moderate		28.2 (26.6–29.9)	2.2 (1.6–2.7)		A. Greshake, *MNB*	0.74	*MNB*	*Anon*	Plagioclase, An$_{92.7\ (91.3–95.6)}$,
High		27.9 (22.1–30.5)	2.3 (1.2–4.8)		A. Greshake, *MNB*	6.2	*MNB*	*Anon*	Plagioclase, An$_{92.1\ (89.5–94.9)}$
High		27.1 (23.7–28.5)	2.6 (1.0–9.3)		A. Greshake, *MNB*	0.54	*MNB*	*Anon*	Plagioclase, An$_{93.2\ (91.2–96.2)}$
W3	18	16			A. Greshake, *MNB*	1.8	*MNB*	*Anon*	
Moderate		25.1 (21.0–27.5)	1.9 (1.0–3.1)		A. Greshake, *MNB*	8.05	*MNB*	*Anon*	Plagioclase, An$_{95.0\ (91.5–97.0)}$
High		28.7 (26.0–29.7)	3.5 (1.2–8.4)		A. Greshake, *MNB*	3.1	*MNB*	*Anon*	Plagioclase, An$_{91.0\ (90.7–91.3)}$
W3	18.6	16.4			A. Greshake, *MNB*	1.45	*MNB*	*Anon*	
W3	11.4–18.3	2.8–19.4			A. Greshake, *MNB*	5.2	*MNB*	*Anon*	
Moderate		30.5 (30.1–31.0)	2.7 (2.0–3.0)		A. Greshake, *MNB*	6	*MNB*	*Anon*	Plagioclase, An$_{93.3\ (90.6–95.4)}$
W3	18.3	16.5			A. Greshake, *MNB*	2.19	*MNB*	*Anon*	
W2/3	17.7	14.1–16.8			A. Greshake, *MNB*	11.13	*MNB*	*Anon*	
Moderate		26.0 (25.2–26.9)	2.1 (1.5–4.4)		A. Greshake, *MNB*	20.1	*MNB*	*Anon*	Plagioclase, An$_{96.0\ (93.0–96.8)}$
W4	24.3	20.5	1.4	4.36	E. Gnos, E. Janots, B. Hofmann	254.4	*NMBE*	*NMBE*	Finders: M. Eggimann, E. Gnos, E. Janots, B. Hofmann, L. Huber, F. Zurfluh
W3	25.5*			4.03	E. Gnos, E. Janots, B. Hofmann	36.9	*NMBE*	*NMBE*	Finders: M. Eggimann, E. Gnos, E. Janots, B. Hofmann, L. Huber, F. Zurfluh
W4	25.1*			3.95	E. Gnos, E. Janots, B. Hofmann	59.5	*NMBE*	*NMBE*	Finders: M. Eggimann, E. Gnos, E. Janots, B. Hofmann, L. Huber, F. Zurfluh
W3	24.4	20.1	1.6	4.19	E. Gnos, E. Janots, B. Hofmann	606.4	*NMBE*	*NMBE*	Finders: M. Eggimann, E. Gnos, E. Janots, B. Hofmann, L. Huber, F. Zurfluh
W4	17.9	15.7	1.4	4.75	E. Gnos, B. Hofmann	6751.4	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, E. Janots, B. Hofmann, L. Huber

Table 5. *Continued*. Meteorites from Asia.

Name	Abbreviation	Location of recovery	Date of recovery	Find/Fall	Latitude	Longitude	Total known mass (g)	Number of pieces	Class	Shock stage
Jiddat al Harasis 505	JaH 505	Oman	Jan 18, 2008	Find	19°41.651′N	55°40.488′E	326.2	3	H5	S3
Jiddat al Harasis 506	JaH 506	Oman	Jan 18, 2008	Find	19°40.497′N	55°38.846′E	2850.3	21	H5	S2
Jiddat al Harasis 507	JaH 507	Oman	Jan 18, 2008	Find	19°40.738′N	55°31.269′E	310.0	1	L6	S2
Jiddat al Harasis 508	JaH 508	Oman	Jan 18, 2008	Find	19°40.186′N	55°30.744′E	387.9	2	L6	S2
Jiddat al Harasis 509	JaH 509	Oman	Jan 18, 2008	Find	19°38.270′N	55°33.742′E	147.8	1	H4	S4
Jiddat al Harasis 510	JaH 510	Oman	Jan 18, 2008	Find	19°38.099′N	55°33.842′E	21.9	3	H6	S5
Jiddat al Harasis 511	JaH 511	Oman	Jan 20, 2008	Find	19°32.513′N	55°9.164′E	166.4	1	H6	S2
Jiddat al Harasis 512	JaH 512	Oman	Jan 20, 2008	Find	19°31.851′N	55°10.799′E	1242.0	63	H4	S3
Jiddat al Harasis 515	JaH 515	Oman	Jan 20, 2008	Find	19°32.978′N	55°14.801′E	24.4	1	L5–6	S3
Jiddat al Harasis 516	JaH 516	Oman	Jan 22, 2008	Find	19°24.647′N	55°6.842′E	172.8	1	H5	S2
Jiddat al Harasis 517	JaH 517	Oman	Jan 22, 2008	Find	19°30.092′N	55°10.375′E	162.3	4	H6	S2
Jiddat al Harasis 518	JaH 518	Oman	Jan 22, 2008	Find	19°31.825′N	55°10.804′E	14.1	1	H6	S2
Jiddat al Harasis 519	JaH 519	Oman	Jan 22, 2008	Find	19°31.836′N	55°10.858′E	0.9	1	H6	S2
Jiddat al Harasis 520	JaH520	Oman	Jan 22, 2008	Find	19°31.829′N	55°10.881′E	117.1	1	L6	S3
Jiddat al Harasis 532	JaH 532	Oman	Jan 22, 2008	Find	19°32.027′N	55°10.487′E	30.8	1	L6	S5–S6
Jiddat al Harasis 534	JaH 534	Oman	Jan 22, 2008	Find	19°32.309′N	55°10.179′E	87.1	1	H6	S2
Jiddat al Harasis 538	JaH 538	Oman	Jan 22, 2008	Find	19°32.718′N	55°9.749′E	316.0	1	H6	S1
Jiddat al Harasis 539	JaH 539	Oman	Jan 22, 2008	Find	19°32.716′N	55°9.740′E	0.5	1	H4	S2
Jiddat al Harasis 540	JaH 540	Oman	Jan 22, 2008	Find	19°32.145′N	55°9.750′E	259.2	1	H5	S2
Jiddat al Harasis 541	JaH 541	Oman	Jan 22, 2008	Find	19°32.194′N	55°9.779′E	104.2	1	H5	S2

Weathering grade	Fa mol%	Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[a]	Type specmen mass (g)	Type specimen location	Main mass[b]	Comments
W4	18.5	16.7	1.5		E. Gnos, B. Hofmann	326.2	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W2	18.4	16.3	1.6		E. Gnos, B. Hofmann	2850.3	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	24.3	20.5	1.6		E. Gnos, B. Hofmann	310.0	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	24.7	20.7	1.7		E. Gnos, B. Hofmann	387.9	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	15.1	13.8	0.9		E. Gnos, B. Hofmann	147.8	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots. Anomalous low Fe in silicates
W4	20.1	17.3	1.3		E. Gnos, B. Hofmann	21.9	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3	19.2	16.4	1.4		E. Gnos, B. Hofmann	166.4	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3	17.7	16.2	0.9		E. Gnos, B. Hofmann	1242.0	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3	25.7	21.6	1.4		E. Gnos, B. Hofmann	24.4	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots. Brecciated
W3	18.9	16.4	1.3		E. Gnos, B. Hofmann	172.8	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3–4	18.5	16.4	1.4		E. Gnos, B. Hofmann	162.3	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	19.5	16.4	1.4		E. Gnos, B. Hofmann	14.1	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	19.4	19.2	0.3		E. Gnos, B. Hofmann	0.9	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	24.0	20.4	1.5		E. Gnos, B. Hofmann	117.1	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	24.1	20.8	1.5		E. Gnos, B. Hofmann	30.8	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3	19.4	16.4	1.4		E. Gnos, B. Hofmann	87.1	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W2	18.3	16.2	1.5		E. Gnos, B. Hofmann	316.0	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3	17.2	15.3	0.9		E. Gnos, B. Hofmann	0.5	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3–4	17.6	16.4	1.3		E. Gnos, B. Hofmann	259.2	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3–4	17.9	15.6	2.0		E. Gnos, B. Hofmann	104.2	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, B. Hofmann, A. Grimberg, E. Janots

Table 5. *Continued*. Meteorites from Asia.

Name	Abbreviation	Location of recovery	Date of recovery	Find/Fall	Latitude	Longitude	Total known mass (g)	Number of pieces	Class	Shock stage
Jiddat al Harasis 542	JaH 542	Oman	Jan 22, 2008	Find	19°36.673′N	55°13.748′E	80.1	5	H4	S1
Jiddat al Harasis 544	JaH 544	Oman	Jan 23, 2008	Find	19°32.851′N	55°9.941′E	78.8	3	H5	S2
Jiddat al Harasis 545	JaH 545	Oman	Jan 23, 2008	Find	19°32.199′N	55°9.766′E	14.6	1	H5	S2
Jiddat al Harasis 546	JaH 546	Oman	Jan 23, 2008	Find	19°32.198′N	55°9.607′E	322.9	1	H6	S2
Jiddat al Harasis 548	JaH 548	Oman	Jan 23, 2008	Find	19°31.861′N	55°10.942′E	433.6	12	L6	S3
Jiddat al Harasis 549	JaH 549	Oman	Jan 23, 2008	Find	19°32.315′N	55°12.101′E	86.5	1	H5	S2
Jiddat al Harasis 550	JaH 550	Oman	Jan 23, 2008	Find	19°32.218′N	55°10.645′E	193.9	1	H6	S2
Jiddat al Harasis 552	JaH 552	Oman	Jan 23, 2008	Find	19°31.5′N	55°11.0′E	17.7	1	L5	S1
Jiddat al Harasis 553	JaH 553	Oman	Jan 24, 2008	Find	19°35.922′N	55°11.264′E	496.5	1	L6	S5
Jiddat al Harasis 554	JaH 554	Oman	Jan 24, 2008	Find	19°35.997′N	55°11.162′E	6.8	1	H6	S2
Jiddat al Harasis 555	JaH 555	Oman	Jan 24, 2008	Find	19°34.323′N	55°29.193′E	1759.6	2	H5	S2–3
Jiddat al Harasis 557	JaH 557	Oman	Jan 24, 2008	Find	19°38.691′N	55°38.537′E	29.9	1	H5	S4
Jiddat al Harasis 558	JaH 558	Oman	Jan 25, 2008	Find	19°45.829′N	56°7.079′E	67.6	1	L6	S2
Jiddat al Harasis 561	JaH 561	Oman	Jan 25, 2008	Find	19°53.958′N	56°10.360′E	8.7	1	H5	S2
Jiddat al Harasis 562	JaH 562	Oman	Jan 26, 2008	Find	19°49.958′N	56°12.790′E	350.0	60	L3.7–3.8	S2
Jiddat al Harasis 563	JaH 563	Oman	Jan 26, 2008	Find	19°40.272′N	56°11.860′E	2141.4	2	H6	S2
Jiddat al Harasis 564	JaH 564	Oman	Jan 26, 2008	Find	19°41.205′N	56°8.648′E	1173.0	71	H6	S2
Jiddat al Harasis 565	JaH 565	Oman	Jan 27, 2008	Find	19°50.053′N	56°29.138′E	3.2	1	H5	S2
Jiddat al Harasis 566	JaH 566	Oman	Mar 6, 2007	Find	19°47.250′N	56°25.209′E	2.4	1	L6	S4
Kumtag		80 miles south of Hami city, Xinjiang province of China	Sept 1, 2008	Find	41°40′8″N	93°10′23″E	>26000	>5	H5	S2
Ramlat as Sahmah 267	RaS	Oman	Jan 16, 2008	Find	20°35.826′N	56°9.052′E	117.1	6	LL6	S1
Ramlat as Sahmah 268	RaS 268	Oman	Jan 16, 2008	Find	20°34.886′N	56°7.794′E	956.8	1	H6	S2

Weathering grade	Fa mol%	Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[a]	Type specmen mass (g)	Type specimen location	Main mass[b]	Comments
W4	17.9	16.0	1.0		E. Gnos, B. Hofmann	80.1	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	17.9	15.6	1.9		E. Gnos, B. Hofmann	78.8	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	18.9	16.4	1.9		E. Gnos, B. Hofmann	14.6	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3	18.7	16.7	1.6		E. Gnos, B. Hofmann	322.9	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	24.0	19.8	1.5		E. Gnos, B. Hofmann	433.6	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	18.0	16.1	1.1		E. Gnos, B. Hofmann	86.5	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3	18.8	16.8	1.2		E. Gnos, B. Hofmann	193.9	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	25.4	21.3	1.4		E. Gnos, B. Hofmann	17.7	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	23.6	20.6	1.6		E. Gnos, B. Hofmann	496.5	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	18.8	16.5	1.2		E. Gnos, B. Hofmann	6.8	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W2	18.9	16.3	1.5		E. Gnos, B. Hofmann	1759.6	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3	20.0	17.3	1.3		E. Gnos, B. Hofmann	29.9	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3	24.0	20.8	1.9		E. Gnos, B. Hofmann	67.6	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W3	18.3	16.0	1.6		E. Gnos, B. Hofmann	8.7	*NMBE*	*NMBE*	Finders: E. Gnos, B. Hofmann, A. Grimberg, E. Janots
W4	15.3–23.2	3.2–18.3	0.2–1.8		E. Gnos, B. Hofmann	350.0	*NMBE*	*NMBE*	Finders: E. Gnos, E. Janots. Chondrule size 0.45 mm, bulk Fe 21.4%.
W3	18.2	16.3	1.5		E. Gnos, B. Hofmann	2141.4	*NMBE*	*NMBE*	Finders: E. Gnos, E. Janots
W2	18.1	16.3	2.1		E. Gnos, B. Hofmann	1173.0	*NMBE*	*NMBE*	Finders: E. Gnos, E. Janots
W4	18.4	16.1	1.4		E. Gnos, B. Hofmann	3.2	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, E. Janots
W3	24.2	20.5	1.7	4.11	E. Gnos, E. Janots, B. Hofmann	2.4	*NMBE*	*NMBE*	Finders: M. Eggimann, E. Gnos, E. Janots, B. Hofmann, L. Huber, F. Zurfluh
W2	19.3	16.8	1.2		Hsu	900	*PMO*	*Wang*	
W4	26.9	22.4	1.5		E. Gnos, B. Hofmann	117.1	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W3	18.6	16.9	2.3		E. Gnos, B. Hofmann	956.8	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg

Table 5. *Continued*. Meteorites from Asia.

Name	Abbreviation	Location of recovery	Date of recovery	Find/ Fall	Latitude	Longitude	Total known mass (g)	Number of pieces	Class	Shock stage
Ramlat as Sahmah 269	RaS 269	Oman	Jan 16, 2008	Find	20°34.277′N	56°7.616′E	438.2	1	H6	S1
Ramlat as Sahmah 270	RaS 270	Oman	Jan 16, 2008	Find	20°33.204′N	56°7.607′E	881.7	Many	L6	S4
Ramlat as Sahmah 271	RaS 271	Oman	Jan 16, 2008	Find	20°31.482′N	56°7.293′E	8904.0	1	L6	S4
Ramlat as Sahmah 272	RaS 272	Oman	Jan 16, 2008	Find	20°30.290′N	56°7.710′E	48.9	1	L5	S3
Ramlat as Sahmah 273	RaS 273	Oman	Jan 16, 2008	Find	20°31.181′N	56°7.412′E	163.3	26	L4–6	S4
Ramlat as Sahmah 274	RaS 274	Oman	Jan 16, 2008	Find	20°34.846′N	56°6.172′E	278.5	3	H4	S1
Ramlat as Sahmah 275	RaS 275	Oman	Jan 16, 2008	Find	20°32.556′N	56°6.410′E	963.6	1	L6	S2
Ramlat as Sahmah 276	RaS 276	Oman	Jan 16, 2008	Find	20°31.350′N	56°7.061′E	12800.0	13	L6	S4
Ramlat as Sahmah 277	RaS 277	Oman	Jan 17, 2008	Find	20°37.037′N	56°8.373′E	47.0	1	H5	S2
Ramlat as Sahmah 278	RaS 278	Oman	Jan 17, 2008	Find	20°37.954′N	56°9.597′E	3208.7	Many	H4	S3
Ramlat as Sahmah 279	RaS 279	Oman	Jan 17, 2008	Find	20°35.795′N	56°12.551′E	648.4	6	H5	S3
Sayh al Uhaymir 487	SaU 487	Oman	Jan 14, 2008	Find	21°16.579′N	57°7.126′E	32.7	2	H6	S3
Sayh al Uhaymir 488	SaU 488	Oman	Jan 14, 2008	Find	21°17.526′N	57°10.680′E	143.3	1	H6	S1
Sayh al Uhaymir 489	SaU 489	Oman	Jan 15, 2008	Find	20°57.561′N	56°58.314′E	3644.6	8	H5	S2
Sayh al Uhaymir 490	SaU 490	Oman	Jan 28, 2008	Find	20°16.390′N	56°38.048′E	277.9	12	H5	S3
Sayh al Uhaymir 491	SaU 491	Oman	Jan 28, 2008	Find	20°17.556′N	56°38.535′E	323.0	1	L3.7	S1
Sayh al Uhaymir 492	SaU 492	Oman	Jan 14, 2008	Find	21°16.107′N	57°7.723′E	1257.1	5	L6	S3
Shişr 165		Oman	Jan 23, 2008	Find	18°36.396′N	53°57.609′E	520.6	1	H4	S3
Yabrin 003		Ash Sharqiyah, Saudi Arabia	MR 19, 2008	Find	23°18.913′	48°37.793′	21.048	1	Acapulcoite	

A key to abbreviations for addresses used in the table can be found at our website, http://tin.er.usgs.gov/meteor/MetBullAddresses.php.
New abbreviations are given below:
MHNGE = Muséum d'histoire naturelle Route de Malagnou 1 CH-1211 Genève 6 Switzerland; *SGS* = Saudi Geological Survey, Jeddah, Saudi Arabia.
Bofang Li, Beijing, China
E. Gnos, *MNNGE*
B. Hofmann, *NMBE*
[a]Name and institution of classifier.
[b]Location or holder of the main mass.

Weathering grade	Fa mol%	Fs mol%	Wo mol%	Magnetic sus	Classifier(s)[a]	Type specmen mass (g)	Type specimen location	Main mass[b]	Comments
W2	18.5	16.1	1.5		E. Gnos, B. Hofmann	438.2	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W4	23.3	19.4	2.4		E. Gnos, B. Hofmann	881.7	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W2	26.2	21.5	1.5		E. Gnos, B. Hofmann	8904.0	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W3	23.5	19.8	0.9		E. Gnos, B. Hofmann	48.9	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W4	23.0	19.3	1.2		E. Gnos, B. Hofmann	163.3	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg. Brecciated
W3	18.2	15.9	1.6		E. Gnos, B. Hofmann	278.5	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W4	24.2	20.2	1.8		E. Gnos, B. Hofmann	963.6	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W2	24.4	21.9	1.0		E. Gnos, B. Hofmann	12800.0	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W3	18.7	16.2	1.4		E. Gnos, B. Hofmann	47.0	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W3	17.1	15.3	1.2		E. Gnos, B. Hofmann	3208.7	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W3	18.1	15.7	1.2		E. Gnos, B. Hofmann	648.4	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W3	18.5	16.7	1.4		E. Gnos, B. Hofmann	32.7	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W1	19.2	17.4	1.2		E. Gnos, B. Hofmann	143.3	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W3	18.1	17.1	1.1		E. Gnos, B. Hofmann	3644.6	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W3	18.5	17.1	1.5		E. Gnos, B. Hofmann	277.9	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, E. Janots
W3	10.0–26.6	8.0–21.5	0.3–1.5		E. Gnos, B. Hofmann	323.0	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, E. Gnos, E. Janots. Chondrule size 0.59 mm, bulk Fe 21.1%
W3	24.2	20.6	1.6		E. Gnos, B. Hofmann	1257.1	*NMBE*	*NMBE*	Finders: A. Al-Kathiri, B. Hofmann, A. Grimberg
W3–4	16.8	15.3	0.8		E. Gnos, B. Hofmann	520.6	*NMBE*	*NMBE*	Finder: A. Al-Kathiri
	11.3–11.9	10.3–11.0	1.2–2.7		E. Gnos, *MHNGE*; B. Hofmann, *NMBE*	4.3	*MHNGE*	*SGS*	Finders: E. Gnos, B. Hofmann, M. Halawani, Y. Tarabulsi and M. Hakeem. Oxygen isotopes (I.A. Franchi and R.C. Greenwood, OU): $\delta^{17}O = 1.13$, $\delta^{18}O = 4.04$, and $\Delta^{17}O = -0.98$ (mean of two replicates) ($\Delta^{17}O = \delta^{17}O - 0.52\ \delta^{18}O$)

Table 6. Meteorites from Australia.

Name	Date of recovery	Find/Fall	Latitude	Longitude	Total known mass (g)	Number of pieces	Class	Shock stage	Weathering grade	Fa mol%	Fs mol%	Wo mol%	Info about the classifier(s)[a]	Type specmen mass (g)	Type specimen location	Info about the main mass[b]	Comments
Camel Donga 041	Mar 13, 1993	Find	030°07.01′S	126°52.53′E	18.8	1	L5	S1	W1	24.5	20.6		Greenwood, *OU*	12.2	*OU*	*WAM*	
Camel Donga 042	Mar 14, 1993	Find	030°07.37′S	126°53.28′E	37.6	1	H3	S1	W2–3	21.6	24.1		Greenwood, *OU*	28.8	*OU*	*WAM*	Estimated to be H3.8. Oxygen Isotopes: $\delta^{17}O = 3.35‰$, $\delta^{18}O = 5.47‰$, $\Delta^{17}O = 0.51‰$; (acid treated) $\delta^{17}O = 2.85‰$, $\delta^{18}O = 4.31‰$, $\Delta^{17}O = 0.60‰$
Camel Donga 043	Mar 14, 1993	Find	030°08.36′S	126°54.06′E	69.95	2	L6	S4–5	W4	25.8	22.3		Greenwood, *OU*	40.0	*OU*	*WAM*	
Camel Donga 044	Mar 15, 1993	Find	030°07.18′S	126°52.01′E	15.29	1	H6	S1	W2	19.4	17.2		Greenwood, *OU*	8.9	*OU*	*WAM*	Oxygen Isotopes: (acid treated) $\delta^{17}O = 2.95‰$, $\delta^{18}O = 4.12‰$, $\Delta^{17}O = 0.81‰$
Camel Donga 045	Mar 15, 1993	Find	030°06.42′S	126°50.53′E	26.9	1	H4	S1	W2	19.3	18		Greenwood, *OU*	17.5	*OU*	*WAM*	
Camel Donga 046	Mar 15, 1993	Find	030°07′.14S	126°50′.28E	9.09	1	LL6	S1	W2	29.3	24.8		Greenwood, *OU*	5.5	*OU*	*WAM*	Oxygen Isotopes: (acid treated) $\delta^{17}O = 3.85‰$, $\delta^{18}O = 5.04‰$, $\Delta^{17}O = 1.23‰$
Camel Donga 047	Mar 17, 1993	Find	030°19′.20S	126°36′.36E	28.27	2	H4/5	S2–3	W4	19.3	17.3		Greenwood, *OU*	17.6	*OU*	*WAM*	
Camel Donga 048	Mar 18, 1993	Find	030°19′.20S	126°36′.36E	104.3	1	L5	S3	W2	25.3	21.7		Greenwood, *OU*	100.0	*OU*	*WAM*	
Camel Donga 049	Mar 18, 1993	Find	030°19′.20S	126°36′.36E	13.63	1	H3	S1	W3	14	16.8		Greenwood, *OU*	9.1	*OU*	*WAM*	Oxygen Isotopes: (acid treated) $\delta^{17}O = 2.84‰$, $\delta^{18}O = 4.27‰$, $\Delta^{17}O = 0.62‰$
Camel Donga 050	Oct 13, 1993	Find	030°06′.51S	126°31′.63E	19.9	1	LL6	S3	W4	26.3	22.5		Greenwood, *OU*	14.4	*OU*	*WAM*	
Camel Donga 051	Oct 17, 1993	Find	030°18′.53S	126°35′.07E	5	1	H5	S2	W3	19.4	16.9		Greenwood, *OU*	3.7	*OU*	*WAM*	
Camel Donga 052	Oct 17, 1993	Find	030°22.11′S	126°36.75′E	61.4	1	H3-an	S2	W3	2.8	18.2		Greenwood, *OU*	34.3	*OU*	*WAM*	Possibly H3.1–3.2. Oxygen Isotopes: (acid treated) $\delta^{17}O = 2.75‰$, $\delta^{18}O = 4.25‰$, $\Delta^{17}O = 0.54‰$
Gunnadorah 011	Oct 24, 1993	Find	030°58.11′S	126°15.12′E	33	1	L	S2	W3	25.4	22.4		Greenwood, *OU*	25.2	*OU*	*WAM*	
Nurina 006	Oct 19, 1993	Find	030°27.60′S	126°23.00′E	45.5	1	L6	S2	W1	25.1	21.2		Greenwood, *OU*	27.0	*OU*	*WAM*	
Nurina 007	Oct 19, 1993	Find	030°28.12′S	126°23.48′E	15.9	1	H3	S1	W3	20.1	16.5		Greenwood, *OU*	11.2	*OU*	*WAM*	Oxygen Isotopes: (acid treated) $\delta^{17}O = 3.45‰$, $\delta^{18}O = 5.56‰$, $\Delta^{17}O = 0.56‰$
Nurina 008	Oct 20, 1993	Find	030°29.45′S	126°23.44′E	73.9	1	H4	S1	W4	18.7	16.8		Greenwood, *OU*	43.4	*OU*	*WAM*	

Table 6. *Continued*. Meteorites from Australia.

Name	Date of recovery	Find/Fall	Latitude	Longitude	Total known mass (g)	Number of pieces	Class	Shock stage	Weathering grade	Fa mol%	Fs mol%	Wo mol%	Info about the classifier(s)[a]	Type specmen mass (g)	Type specimen location	Info about the main mass[b]	Comments
Nurina 009	Oct 21, 1993	Find	030°53.77′S	126°26.89′E	87	1	L4	S1	W2	25.1	22.3		Greenwood, *OU*	53.0	*OU*	*WAM*	
Sleeper Camp 018	Mar 10, 1993	Find	030°06.14′S	126°21.09′E	14.24	1	H6	S4	W5	19.4	16.2		Greenwood, *OU*	8.9	*OU*	*WAM*	
Sleeper Camp 019	Mar 10, 1993	Find	030°06.31′S	126°21.00′E	11.5	1	CK4–5	S1	W1	29.8			Greenwood, *OU*	7.0	*OU*	*WAM*	Oxygen Isotopes: $\delta^{17}O$ = -4.23‰, $\delta^{18}O$ = 0.21‰, $\Delta^{17}O$ = 4.12‰
Sleeper Camp 020	Nov 10, 1993	Find	030°06.81′S	126°15.07′E	18.6	1	LL3.9–4	S1	W3	27.8	22.4		Greenwood, *OU*	13.0	*OU*	*WAM*	Oxygen Isotopes: $\delta^{17}O$ = 4.38‰, $\delta^{18}O$ = 6.60‰, $\Delta^{17}O$ = 0.95‰; (acid treated) $\delta^{17}O$ = 3.63‰, $\delta^{18}O$ = 5.29‰, $\Delta^{17}O$ = 0.88‰
Sleeper Camp 021	Nov 10, 1993	Find	030°07.10′S	126°14.86′E	25.6	1	LL5	S4	W4	27	21.8		Greenwood, *OU*	16.9	*OU*	*WAM*	
Sleeper Camp 022	Nov 10, 1993	Find	030°06.39′S	126°15.76′E	63.5	1	L5	S4	W4	23.8	19.5		Greenwood, *OU*	36.8	*OU*	*WAM*	
Sleeper Camp 023	Nov 10, 1993	Find	030°06.52′S	126°15.62′E	72.3	1	H4	S2	W2	19.3	17.3		Greenwood, *OU*	47.2	*OU*	*WAM*	
Sleeper Camp 024	Dec 10, 1993	Find	030°06.33′S	126°15.33′E	30.3	1	L5	S2–3	W1	25	19.9		Greenwood, *OU*	22.2	*OU*	*WAM*	

A key to abbreviations for addresses used in the table can be found at our website, http://tin.er.usgs.gov/meteor/MetBullAddresses.php.
[a]Name and institution of classifier.
[b]Location or holder of the main mass.

Table 7. Meteorites from Europe.

Name	Location of recovery	Type of find site	Date of recovery	Find/Fall	Latitude	Longitude	Total known mass (g)	Number of pieces	Class	Weathering grade	Fa mol%	Fs mol%	Wo mol%	Info about the classifier(s)[a]	Type specmen mass (g)	Type specimen location	Info about the main mass[b]	Comments (limited to one cell)
Paris	Unknown	Auction room	2001	Find	48°50′N	2°20′E	1370	1	CM	W0	0.2–55	0.6–4.4		Bourot-Denise, Zanda	1275	MNHNP	MNHNP	See written description

A key to abbreviations for addresses used in the table can be found at our website, http://tin.er.usgs.gov/meteor/MetBullAddresses.php.
[a]Name and institution of classifier.
[b]Location or holder of the main mass.