



Antarctic Meteorite NEWSLETTER

A periodical issued by the Antarctic Meteorite Working Group to inform scientists of the basic characteristics of specimens recovered in the Antarctic.

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This newsletter includes data sheets on several achondrites recovered in the 1979 season. Investigators should submit sample requests to:

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Although these requests may not be received in time to be considered by the MWG at their September 12 meeting, allocations of these achondrites may still be possible before the Spring, 1981 meeting of the MWG. Investigators, therefore, are urged to submit their requests for these achondrites before October 15, 1980.

Sample No.: ALHA78084
 Field No.: 270
 Weight (gms) 14280.0
 Meteorite Type: H3 Chondrite

Location: Allan Hills

Physical Description:

This is a complete specimen with splotchy brown and black fusion crust covering the entire meteorite. Several large fractures penetrate the interior of the stone. A thin white deposit was evident along some of these cracks after the meteorite was dried. Many light colored rounded and irregular inclusions are apparent on the cut faces, some as large as 4 mm in diameter. Metal is visible though most of the metal have halos around them, giving the cut faces a marbled look of small fresh areas and large oxidized areas.

Petrographic Description: Brian Mason

The section shows a close-packed aggregate of chondrules, 0.3-1.2 mm in diameter, and a few angular enclaves (some are chondrule fragments), in a minor amount of fine-grained matrix. A wide variety of chondrules is present, the commonest being porphyritic olivine and olivine-pyroxene with interstitial glass; some of the glass is brown and transparent, but much of it is turbid and partly devitrified. The pyroxene is polysynthetically twinned clinobronzite. The matrix contains a considerable amount of fine-grained nickel-iron and a lesser amount of troilite. Weathering is extensive, with veins and patches of brown limonite throughout the section. Microprobe analyses show olivine of rather uniform composition, averaging Fa_{18} , and pyroxene of variable composition, Fs_{8-24} , average Fs_{13} . The mean composition of the olivine and the amount of nickel-iron indicate H group and the meteorite is classified as an H3 chondrite.

Sample No.: META78007
 Field No.: 347
 Weight (gms): 174.8
 Meteorite Type: H6 Chondrite

Location: Meteorite Hills

Physical Description:

Fusion crust ranging from dull-black to iridescent red-brown totally covers this irregular shaped meteorite. The interior of the stone is 75% weathered. The unweathered part appears to have many clasts; one 0.5 cm diameter clast was noted. This stone was magnetically oriented in Antarctica and the orientation has been kept throughout processing.

Petrographic Description: Brian Mason

Chondrules are sparse and poorly defined, tending to merge with the granular groundmass, which consists of olivine and pyroxene, with minor amounts of nickel-iron and troilite, and a little plagioclase. Weathering is extensive, with brown limonitic staining throughout the section. Well-preserved fusion crust is present along one edge. Microprobe analyses give the following compositions: olivine, Fa_{19} ; orthopyroxene, Fs_{17} , plagioclase, An_{13} . The meteorite is an H6 chondrite.

Sample No.: ALHA79017
 Field No.: 1199
 Weight (gms): 310.0
 Meteorite Type: Eucrite or Howardite

Location: Allan Hills

Physical Description:

This achondrite is mostly covered with a shiny black fusion crust that contains flow bands on all surfaces. The areas devoid of fusion crust are medium-gray in color and speckled with light and dark colored clasts which are <1 mm in diameter. Large clasts up to 0.5 cm in length were noted.

The interior, which was exposed through chipping, is lighter gray in color than the exterior. Several clasts up to 1.2 cm were exposed.

This meteorite looks similar to other eucrites in the 1977, 1978 and 1979 collection.

Petrographic Description: Arch Reid

The meteorite is a breccia with mostly angular but a few subrounded clasts. Pyroxene and feldspar dominate, ranging up to 2 mm and down to very fine grains in the matrix. Some of the larger pyroxene clasts, up to 2mm, have sharp outer rims .03 mm thick of contrasting composition. A variety of clast types occur and these include: 1) pigeonite vitrophyres comprising euhedral to skeletal pigeonites ($Wo_4En_{48}Fs_{49}$) up to .6mm, in a very fine grained matrix; 2) fragments of eucrite with igneous textures; 3) dark aphanitic clasts and; 4) a feldspar-rich clast with only minor pyroxene. The analysed pyroxenes are all low Ca pigeonites, $Wo_6En_{68}Fs_{28}$ to $Wo_8En_{41}Fs_{52}$. Some large single pyroxenes $Wo_6En_{65}Fs_{29}$ have sharply defined outer rims of $Wo_7En_{40}Fs_{53}$. Feldspars range from $Or_{.1}Ab_7An_{93}$ to $Or_{.3}Ab_{12}An_{88}$ with more sodic grains ($Or_2Ab_{21}An_{77}$) in some of the igneous clasts. The meteorite shows a limited range of mineral compositions and clast types in a preliminary examination and is classified as a polymict eucrite or a howardite.

Sample No.: EETA79001
 Field No.: 1043
 Weight (gms): 7942.0
 Meteorite Type: Shergottite

Location: Elephant Moraine

Physical Description:

All but one surface of this achondrite (22 x 17 x 14 cm.) is covered with black fusion crust, but there are areas on all surfaces where the fusion crust has been plucked away. One surface has a deep regmaglypt that is covered with fusion crust. The areas void of fusion crust are white-gray in color and the matrix appears porous. Veins (~0.5 mm wide) of dark material criss-cross each other. Whitish-yellow clasts (~3mm diameter) are scattered all over this achondrite. Most of the specimen appears very fine-grained but a small part near the E surface has a different lithology.

Sawing this meteorite in two exposed a light colored interior with rounded white clasts, as large as 0.5 cm in diameter. Several large black fine-grained clasts as large as 2.5 cm are scattered over the cut face. Some of these black clasts contain vugs which have glass in their interior. Upon chipping one of these clasts containing a vug, the entire clast popped out easily and no matrix adhered to the clast. Numerous veins of black material criss-cross each other. Most of these veins run through a black clast. The longest vein is ~14 cm long. Near the W end of the cut face are brownish clasts which may or may not be pyroxene clasts. 90% of the cut face is fine-grained. 10% (near the E end) of the cut face consists of intergrown pyroxene and feldspar in a basaltic texture.

Petrographic Description: Arch Reid

Thin sections were cut from the three different lithologies: 1) the main mass of the meteorite; 2) the material with basaltic texture that is present at one end of the sample, and; 3) the dark clasts included in the main mass.

The main mass is a shocked but unbrecciated pyroxenite with pyroxene as the major phase but also containing maskelynite, Mg-Al chromite, iron sulphide and ilmenite(?). The major pyroxene is polysynthetically twinned pigeonite (?) (resembling twinned clinobronzite) ranging in composition from $Wo_5En_{70}Fs_{25}$ to $Wo_{12}En_{50}Fs_{38}$. Orthopyroxene forms the cores of larger pyroxene grains and ranges in composition from $Wo_{1.5}En_{83}Fs_{16}$ to $Wo_3En_{78}Fs_{19}$. The larger pyroxenes grains, up to 3.5 mm, comprise untwinned cores zoned outward to polysynthetically twinned rims. The smaller pyroxenes, .3 to 1 mm, are twinned clinopyroxenes and are intergrown with maskelynite laths. The maskelynite ranges in composition from $Or_1Ab_{39}An_{60}$ to $Or_{1.5}Ab_{44}An_{55}$. A few large olivines, Fo_{77} to Fo_{73} range up to 2.5 mm.

The less abundant lithology closely resembles Shergotty in texture but is finer grained. The major minerals are clinopyroxene and maskelynite: calcium phosphate, SiO_2 , ilmenite (?) and magnetite (?) are also present. Elongate clinopyroxene and laths of maskelynite are about one mm long and generally subparallel: many of the maskelynite grains contain pyroxene inclusions. Analysed pigeonites range from $Wo_{10}En_{52}Fs_{38}$ to $Wo_{18}En_{15}Fs_{67}$. The maskelynite also shows a range in composition from $Or_{.5}Ab_{38}An_{62}$ to $Or_4Ab_{50}An_{46}$.

The dark clasts are apparently loci of melting; in many cases they connect with the thin black glassy (?) veinlets that traverse much of the meteorite. Thin sections from these dark areas show glass (with relict olivine, pyroxene and maskelynite inclusions), devitrified glass, areas with mosaic texture and vesicular areas with quench textures. The dark areas appear to be more common in olivine-bearing portions of the main mass.

The meteorite is classed as a shergottite because of the close similarities to the shergottites in texture and mineralogy. Both lithologies however are distinct from Shergotty and Zagami.

Sample No.: EETA79002
 Field No.: 1206
 Weight (gms): 2843.0
 Meteorite Type: Diogenite

Location: Elephant Moraine

Physical Description:

This rounded meteorite has dull black fusion crust on all surfaces except for one which is a fracture surface. Fusion crust has been plucked away on all surfaces revealing a medium-gray colored matrix with many light to cream colored clasts (~.5 cm diameter). Several areas have been heavily oxidized giving these parts a red-brown color. Many fractures penetrate this meteorite.

Chipping this sample revealed a large weathering rind that is orangish-brown in color and is as wide as 1 cm. The interior matrix is blue-gray in color with many small (<1mm) clasts. Two white clasts ~0.5 cm diameter were exposed. No metal was obvious.

Dimensions: 15 x 13.5 x 10 cm.

Petrographic Description: Arch Reid

The one thin section cut from the meteorite is a breccia with a very cohesive fine grained matrix. Clasts are monomineralic, angular and range up to 2 mm. One angular lithic clast is polymineralic but extremely fine grained. The vast majority of the mineral fragments are low calcium pyroxenes of near constant composition, $Wo_2En_{76}Fs_{22}$. The only other silicate phase identified was olivine, Fo_{75-76} . Small areas within the breccia are rich in very fine opaque minerals. The meteorite is a diogenite but is texturally distinct from the common diogenites.

Sample No.: EETA79004
Field No.: 1037
Weight (gms): 390.3
Meteorite Type: Eucrite

Location: Elephant Moraine

Physical Description:

Dimensions: 11 x 6.5 x 4 cm.

This oblong achondrite is covered with a thin dull fusion crust on all but two surfaces. The exterior matrix appears medium to dark gray in color and contains numerous clasts as large as 2 cm in diameter. Most of the larger clasts are dark in color though light colored clasts do exist. Vugs are apparent in this meteorite. Most are concentrated on surface in an area devoid of fusion crust. These vugs are as deep as 1 cm, as wide as 0.5 cm.

The interior matrix is light gray in color with many inclusions. The one clast seen on the exterior extends 2.0x0.8 cm into the interior and appears to be easily plucked out. Many of the clasts in this achondrite will be easily plucked out. Several spots of severe oxidation are visible.

Petrographic Description: Arch Reid

Thin section shows a breccia dominantly made up of pyroxene and feldspar fragments in a fine-grained matrix. Much of the matrix is dark, fine-grained and may be recrystallized. The clasts are generally angular but some have less well-defined outlines and may have undergone reheating. Mineral fragments range up to 1.3 mm and comprise pyroxene (some showing exsolution), feldspar and less common opaques. Angular lithic clasts include fragments of very fine grained eucrite (2-5 mm), fine grained eucrite, and dark aphanitic material (1.6 mm). Pyroxene compositions show a range in Ca contents with little variation in Mg/Fe ($Wo_2En_{45}Fs_{53}$ to $Wo_{40}En_{36}Fs_{24}$ with low Ca compositions most abundant, in the few grains analysed). Feldspars analysed range from $Or_1Ab_6An_{93}$ to $Or_1Ab_{14}An_{85}$. The meteorite is classed as a eucrite.

Sample No.: EETA79006
Field No.: 1042
Weight (gms): 7164
Meteorite Type: Howardite

Location: Elephant Moraine

Physical Description:

Dull to shiny black fusion crust appears on only part of one surface on this achondrite. Many vugs are apparent all over the meteorite, some of which have clasts in their interior. The medium gray matrix contains a variety of clasts (dark gray, yellow, white colored clasts), the largest being 1 cm in its longest dimension. Several rounded spots of oxidation are obvious and several cracks appear to penetrate the sample.

The interior of the meteorite is lighter-gray in color than the exterior. Several clasts (~3 mm diameter) were revealed after the specimen was chipped.

Dimensions: 14 x 8.5 x 4.5 cm.

Petrographic Description: Arch Reid

The thin section shows a fine breccia with angular pyroxene and feldspar fragments and less common opaques. The larger pyroxene fragments up to 1 mm are commonly deformed and some show exsolution. There are a variety of clast types and these include the following: 1) small eucritic fragments with fine grain size, clasts up to 2 mm; 2) polymineralic pyroxene-feldspar intergrowths; 3) fragments of brown devitrified glass, up to 1 mm; 4) one fragment, 2 mm, with feldspar >>pyroxene; 5) one fragment, 2 mm, with pyroxene >>feldspar, and; 6) one 4.5 mm recrystallized eucrite clast with mosaic texture. Analysis of pyroxenes yields a wide range of compositions from $Wo_1En_{80}Fs_{19}$ to $Wo_{15}En_{28}Fs_{57}$. The meteorite contains a variety of clast types and a wide range of pyroxene compositions and is classed as a howardite.

