

New Lunar Meteorite

Sample Name: Yamato 983885 Location: JARE IV Nunataks
Dimensions (cm): 8.4 x 5.4 x 5.2 Weight (g): 289.71
Weathering: A Fracturing: B
Meteorite Type: Lunar Anorthositic Breccia

Macroscopic description (Kaiden H.)

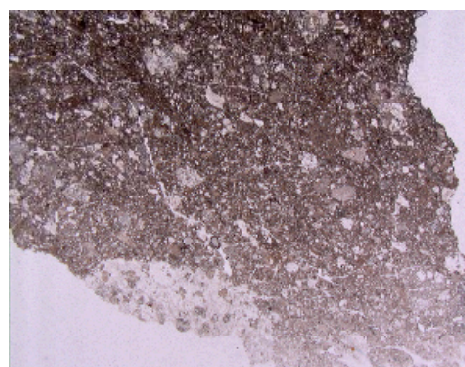
It is a rounded stone with some thin yellowish green fusion crust. Angular white to gray clasts (up to 3 mm in size), white crystalline plagioclases, pyroxenes and dark grains set in a dark fine-grained matrix.

Petrographic Description (Kaiden H.)

A thin section (71-1) shows a polymict breccia containing polymineralic and monomineralic clasts (up to 1.2 mm in size) set in a dark brown clastic matrix. Most of larger clasts are polymineralic, frequently composed of calcic plagioclase pyroxene and olivine, less commonly plagioclase and olivine, or plagioclase alone. Smaller clasts are dominantly mineral fragments of plagioclase, with some pyroxenes and olivines. Glass spherules, up to 0.3 mm in diameter, are also observed.

EPMA analyses show a pyroxene composition range of $\text{En}_{14-85}\text{Fs}_{12-55}\text{Wo}_{2-40}$; aplagioclase range of An_{89-98} ; and an olivine range of Fo_{32-36} .

The average FeO/MnO ratios of pyroxenes (64) indicates that this rock is lunar rock. The oxygen isotopic composition (analyzed by Clayton and Mayeda) of a bulk rock sample that is $\delta^{18}\text{O}=+5.65$, $\delta^{17}\text{O}=+2.89$, $\Delta^{17}\text{O}=-0.05$, also indicates that the meteorite is lunar origin.



Nakhlite

Sample Name: Yamato 000593
Dimensions (cm): 29 x 22 x 16
Weathering: B
Meteorite Type: Nakhlite

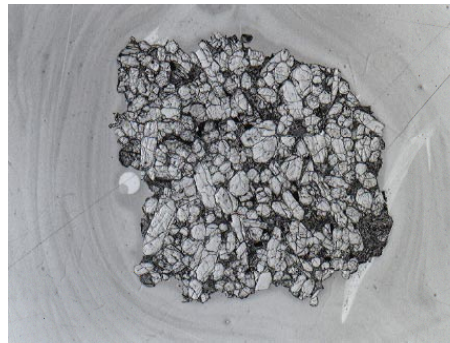
Location: JARE IV Nunataks
Weight (g): 13713
Fracturing: B

Macroscopic description

This is a subrounded nearly complete stone with one large dented surface. 60% of the stone is covered by shiny black fusion crust. Exposed interior shows medium-grained granular texture and is dark green in color.

Petrographic Description (Imae N.)

The section mainly consists of coarse-grained euhedral and subhedral augite (up to 1 mm x 0.5 mm) showing polythintetic twinning. Minor amount of olivine (up to 0.5 mm) and magnetite (up to 0.1 mm) also observed. Mesostasis includes radial plagioclase crystals. Pyroxene composition is $\text{En}_{20-40}\text{Fs}_{22-40}\text{Wo}_{38-40}$. Olivine composition is Fa_{62-78} . Plagioclase is $\text{An}_{26-32}\text{Ab}_{63-65}\text{Or}_{4-8}$.



Sample Name: Yamato 000749
Dimensions (cm): 11 x 10 x 9
Weathering: B
Meteorite Type: Nakhlite
Pairing: Yamato 000593

Location: JARE IV Nunataks
Weight (g): 1283
Fracturing: B

Macroscopic description

This is pyramidal in shape. Two faces are broken surface. 40% of the surface is covered shiny black fusion crust. Exposed interior shows medium-grained granular

texture and is dark green in color.



Other achondrites

Sample Name: Yamato 980318
Dimensions (cm): 6.9 x 4.7 x 3.8
Weathering: B/C
Meteorite Type: Eucrite

Location: Minami-Yamato Nunataks
Weight (g): 166.81
Fracturing: B

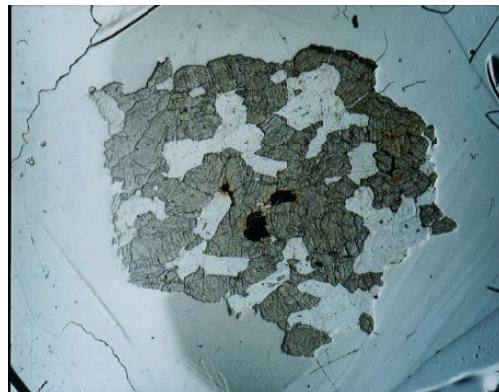
Macroscopic description

This is a subrounded complete stone. 70% of its surface is covered shiny black fusion crust. Exposed interior shows coarse-grained granular texture composed of gray pyroxene and white plagioclase.

Petrographic Description (Yamaguchi A.)

The section consists of coarse-grained low-Ca pyroxene and plagioclase (<5 mm) with minor amount of opaque minerals. The low Ca-pyroxene contains exsolution lamellae of augite (~30 μm thick). Pyroxene compositions cluster around $\text{Wo}_2\text{Fs}_{48-49}$ and $\text{Wo}_{45-46}\text{Fs}_{18-19}$. Plagioclase composition is An_{88-91} . This meteorite is a Mg-rich eucrite.

Oxygen isotopic composition ($\delta^{18}\text{O}=+3.18$, $\delta^{17}\text{O}=+1.36$, $\Delta^{17}\text{O}=-0.29$) analyzed by Clayton and Mayeda indicates that this meteorite is an HED.



Sample Name: Yamato 981651
Dimensions (cm): 8.4 x 5.4 x 3.9
Weathering: A
Meteorite Type: Glassy basalt

Location: Minami-Yamato Nunataks
Weight (g): 235.88
Fracturing: A

Macroscopic description

This is a subrounded complete stone. Some amount of small patchy fusion crust is remaining. Many rounded vesicles (up to 3 mm) are observed on the half of the surface. Remaining surface is smooth and compact. Exposed interior is fine-grained and dark gray in color.

Petrographic Description (Yamaguchi A.)

The section shows an elongated, hollow skeletal grains of pyroxene (~0.05 x 2 mm) in a glassy matrix. This meteorite contains many irregular to rounded vesicles (<0.6 mm). Pyroxene (Fs₂₆₋₃₃En₅₀₋₆₂) is rich in Al₂O₃ (7-8 wt%). The FeO/MnO ratios of pyroxenes (25-30) and oxygen isotopic composition ($\delta^{18}\text{O}=+3.55$, $\delta^{17}\text{O}=+1.44$, $\Delta^{17}\text{O}=-0.44$) analyzed by Clayton and Mayeda indicate that this meteorite is a eucrite.

