

New Martian Meteorite Identified as a Lherzolithic Shergottite Similar to ALH-77005 Meteorite. K. Yanai, Faculty of Engineering, Iwate University, Ueda 4-3-5 Morioka 020-8551, Japan. E-mail: yanaik@iwate-u.ac.jp

A meteorite found at Antarctica, which we have given the tentative name of YA1075, has been identified as the new martian meteorite which belong to one of shergottite. The YA1075 meteorite is 55 grams in weight which nearly complete stone with dark green color and partly covered by the shiny-black fusion crust. The interior of the stone shows grey to light grey in color, and brecciated partly. The stone looks like type A of the Yamato diogenites especially Yamato-74013 diogenite for its appearance. The YA1075 meteorite is also similar to one of Antarctic martian meteorites such as ALH-77005 lherzolithic shergottite[1] and other shergottites.

The YA1078 meteorite consists mostly of pyroxenes including many olivine grains poikilitically with maskelynitized plagioclase interstitially, and traced some opaques. The specimen have been identified as one of the martian meteorite for its mineral assemblages and mineral compositions, especially its maskelynitized plagioclase and their compositions (~An50). Clayton(1999)[2] analyzed this meteorite on oxygen isotopic compositions and he suggested that the YA1075 meteorite is one of the martian meteorites based on following oxygen istopes: $3.95\delta^{18}O$, $2.23\delta^{17}O$ and $+0.18\Delta^{17}O$. Oxygen isotope data strongly supported to authors conclusion.

Under the polarizing microscope, the thin section of the YA1075 meteorite is unbrecciated-crystalline lithology showing a typical poikilitic texture of large pyroxene grains in which included lot of rounded olivine grains with interstitial maskelynitized plagioclase(Fig.1). Pyroxene occurs as the main phase in the YA1075 meteorite and included many poikilitically small-rounded olivine grains with less amount of maskelynitized plagioclase interstitially. Pyroxene as the host phase are Mg-rich orthopyroxene ranged En73-77Fs15-22Wo2.5-5. Compositions of clinopyroxene ranged En47-52Fs14-16Wo32-38, and they appear as small grains in the host orthopyroxene. Some pyroxene grains are plotted in the pigeonite region with little compositional variation such as En65-70Fs22-26Wo7.5-9.5. Very small unusual pyroxene grains

occur in inclusion in olivine together with glass phase, and their compositions are quite differed from most pyroxenes. Those pyroxene in the inclusion are fassaite and their compositions are En33.7Fs15.7Wo50.6 and En29.7Fs19.3Wo51.0(Fig.2). Most of olivine occur as rounded individual small grains in large orthopyroxene grains. So they show a typical poikilitic texture. Most of rounded olivine grains are little elongated and show weakly arrangement. Olivine show homogenous compositionally and they are Mg-rich about Fo70.7Fa29.3, and ranged Fo67.7-74.5 Fa25.5-32.3. The composition of olivine is similar to those of some martian meteorites, some diogenites and some lunar meteorites. Plagioclase occur interstitially as a minor phase at pyroxene-pyroxene and pyroxene-olivine grain boundaries. Plagioclase are completely maskelynitized and those compositions are nearly intermediate Ab48.5An50.1Or1.3 with little compositional variation ranged Ab45.3-59.8An38.2-53.6Or0.9-2.0. Plagioclase of the YA1075 meteorite has a very unique compositions as same as those of the martian meteorites especially those of shergottites for example ALH-77005 lherzolithic shergottites(Fig. 2) and other shergottites. However the YA1075 meteorite is quite differed from those of all known other achondrites, particularly all of diogenitic achondrites and all eucrites, and all of the lunar meteorites. So author concluded that the YA1075 meteorite is a martian meteorite belong to one of lherzolithic shergottite.

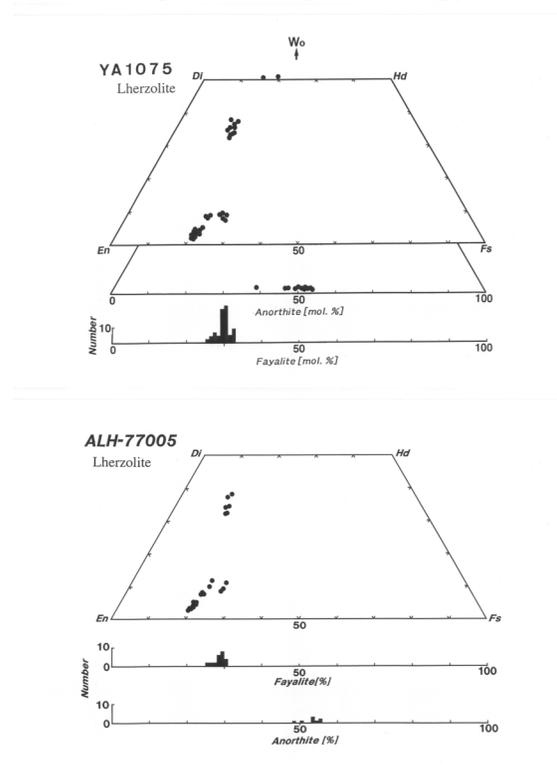
References:[1] Yanai K. (1981) Photographic Catalog of the Selected Antarctic Meteorites, 104p. [2] Clayton R. N. (1999) Personal Communication.

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Fig.1. Photomicrograph of thin section of newly identified martian meteorite YA1075(tentative name) showing typical poikilitic texture : field view is 11.6mm.

Fig. 2. Compositon diagrams for pyroxene,



plagioclase(maskelynite) and olivine of the YA1075 meteorite and ALH-77005 lherzolitic shergottite.