BASALTIC SHERGOTTITE, JIDDAT AL HARASIS 479

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Introduction: Martian meteorite, Jiddat Al Harasis 479, (JaH 479) was found in the desert of Oman in 2008 [1]. We have studied its mineralogy, petrography, chemistry and oxygen isotopic compositions. In addition, results of its noble gases investigation are presented in this volume [2].

Results and discussion: The meteorite is unbrecciated, coarse-grained subophitic rock, consisting mainly of pyroxene and plagioclase. Pyroxene is presented by differently oriented, anhedral pigeonite and subhedral, elongated, augite grains of 1-3 mm in size. Several pigeonite grains are long lathes up to 10 mm. Pigeonite crystals are twinned and show undulatory extinction. Feldspar is isotropic (maskelynite), but several grains demonstrate a weak anisotropy. Maskelynite is presented by lathes of 0.04-0.06 x 1.5 mm in size, and by prismatic grains of smaller size, growing between pyroxene crystals. The minor phases are olivine, ilmenite, silica, orthoclase, Ca-phosphates, zircon, pyrrhotite and troilite. The fine-grained aggregates of clinopyroxene, olivine and silica occur on the outer parts of pyroxene grains. The rare black melt veins of 0.1-0.2 mm wide are crossing the rock.

Pigeonite is normally zoned, from $En_{45.8}Wo_{23.5}$ to $En_{15.3}Wo_{19.9}$ (Fe/Mn = 37). Augite is $En_{14.7\text{-}46.0}Wo_{20.4\text{-}31.4}$ (Fe/Mn = 28). Maskelynite is not stoichiometric and irregularly varies in composition from $An_{76}Ab_{18}Or_{6}$ to $An_{66}Ab_{31}Or_{3}$. Olivine is $Fo_{3.85}$ (Fe/Mn = 54). Pyroxene in fine-grained aggregates with olivine and silica is $En_{4.5}Wo_{40.4}$. These aggregates are similar to those that found in several shergottites [3]. They probably were formed due to breakdown of metastable FeO-rich pyroxene or pyroxferroite. Ca-phosphates are F-Cl apatite and Cl-poor phosphate - $Ca_{9.2}(Fe_{0.9}Mg_{0.2})Na_{0.4}(PO_3F_{0.5})(PO_4)_6$, that could be close to Fe-rich bobdownsite ($Ca_9Mg(PO_4)_6(PO_3F)$) [4]. According to [5-6], the JaH 479 was shocked to approximately 32 GPa. Concentrations of REEs in JaH 479, determined by INAA, are (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 compositions of JaH 479 is: $\delta^{17}O$ = 2.951 ‰, $\delta^{18}O$ = 5.070 ‰, $\Delta^{17}O$ = 0.315 ‰.

Conclusions: The Mn/Fe ratios in the pyroxene and oxygen isotopes composition of JaH 479 are in the range of those of Martian meteorites [7]. Based on mineralogy and petrology, JaH 479 is a basaltic shergottite. The CI-normalized REEs pattern of JaH 479 shows moderate depletion in LREE relatively HREE and it is close to that of Zagami [8].

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