Re-search for the martian meteorites from diogenitic achondrites

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The thirteen meteorites were idenified as the martian origin and they were believed originating from the Mars surface by the recent impact events in long solar system evolution. Here I report again on re-searching the martian meteorite(s) from diogenitic achondrites. Some features of "diogenites", especially Yamato-74013 type diogenite with pale green color similar to some of the martian meteorites such as ALH-77005 lherzorite(lherzoritic shergottite). A diogenitic specimen(tentative name 1075) studied well resembles to one of the martian type rock for its mineral assemblages and mineral compositions, particularly its plagioclase(maskelynized plagioclase) composition.

The twelve meteorites were idenified as the martian origin and they were believed originating from the Mars surface by the recent impact events in long solar system evolution. Recently one more specimen collected in the Sahara Desert, Africa has been positively indentified as originating from the Mars. It is the thirteenth martian meteorite, ~2kg in origianl weight[1].

Here I report again on re-searching the martian meteorite(s) from diogenitic achondrites[2]. Some features of "diogenites", especially Yamato-74013 type diogenite with pale green color similar to some of the martian meteorites such as ALH-77005 lherzorite(lherzoritic shergottite)[3]. A diogenitic specimen(tentative name 1075) studied well resembles to one of the martian type rock for its mineral assemblages and mineral compositions, particularly its plagioclase(maskelynized plagioclase) composition. The specimen consists mainly of pyroxene, olivine with maskelynite showing poikilitic texture with some shocked parts. Interstitial plagioclase is complete maskelynized with intermediate composition. The plagioclase composition of this spicemen quite differ from all of those of diogenites, howardites, eucrites, lunar meteorites and other achondrites except those of the martian meteorites.

An examination of the polished thin section of the specimen shows a typical poikilitic texture of pyroxene including lot of olivine grains and less amount of the interstitial plagioclases with partly brecciated. Pyroxene occurs as the main phase in the specimen and several large pyroxene grains included poikiliticaly many olivine grains with less amount of plagioclase. Lot of small fragmental grains of pyroxene are in the shocked black matrix. Pyroxene compositions are Mg-rich orthopyroxene about En70Fs20Wo10, in the host phase with poikilitic texture. Clinopyroxene compositions are about En50Fs15Wo35 in small grains, and some pyroxene grains plot in the pigonite region with little compositional variation. Olivine is second major phase in the specimen. They occur as an euhedral to subhedral and rounded individual grains, and some are in aggregates of fine grains. Most olivine are included poikilitically with in large pyroxene grains, but some one occur as grains or fragments in the shocked black matrix. Olivine shows homogeneous compositionally and Mg-rich about Fo70. The compositions similar to those of some martian meteorites, some diogenites and some lunar meteorites. Olivine grains associated with the shocked blackened matrix have neary the same compositions as that of the main olivine. Plagioclase occurs interstitially as a minor phase at pyroxene-pyroxene and pyroxene-olivine grain boundaries. Plagioclase is completely maskelynized and those compositions are nearly intermediate ~An55 with little compositional variations. Plagioclase of this specimen has a very similar composition to those of the martian meteorites especially those of the shergottites, but it is quite different from all known other achondrites, particularly all diogenitic achondrites.

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