ANTARCTIC GRV9927: A NEW MEMBER OF SNC METEORITES. Cheng-Yi LIN[1], Fu-Sheng ZHANG[1], He-Nian Wang[2], Ru-Cheng Wang[2], and Wen-Lan ZHANG[2], [1]Center for Materials Analysis, [2]Department of Earth Sciences,and Laboratory of Mineralizing Process of Ore Deposits, Nanjing University, Nanjing 210093 P. R. China.

The SNC meteorites are an uncommon clan of achondrites comprising shergottites, nakhlites and Chassigny. They are similar in many respects to terrestrial basalt, harzburgite, clinopyroxenite or dunite. At present many scientists consider that these meteorites were from the Mars[1].

Since the first handful of Antarctic meteorites found by Japanese glaciologists in 1969, Antarctica's ice fields have provided an unmatched source of extraterrestrial material – including most of the lunar and almost half Martian achondrites. As McSween(1999) reported that 13 Martian meteorites are recognized to have reached the Earth from the Mars, including ALHA77005[2].

The GRV9927 meteorite was collected from the ice sheet in the vicinity of the Grove Hill by Xiao-Han LIU and Yi-Tai JU from the Academy Sinica during the 16th Antarctic expedition in 1999. Based on the observations under polarizing microscope, scanning electron microscope and electron probe microanalyses the GRV9927 meteorite is considered as an ultramafic achondrite. Its mineral and chemical compositions are quite similar to those of the ALHA77005 meteorite. It implies that the GRV9927 meteorite can be recognized as a member of SNC clan.

The GRV9927 meteorite looks like a rounded triangular cone. It is 9.97g in weight and partially covered by dark fusion crust. This meteorite consists predominantly of olivine and pyroxene. The olivine crystals have a distinctive brown colour and the pyroxenes are colourless in thin sections. The structure and texture are heterogeneous on a centimeter scale. Both cumulate and poikilitic textures can be seen under the polarizing microscope. Some euhedral and subeuhedral olivines cumulate compactly with interstitial pyroxens in certain areas and some euhedral olivine crystals are enclosed by pyroxenes in other areas. A small amount of maskelynite, kamacite, troilite and chromite can be found in the interstices between olivines and pyroxenes. The mineral composition of the GRV9927 is intermediate between pyroxene-rich nakhlites and olivine-rich Chassigny. In addition, the pyroxene in GRV9927 is mainly orthopyroxene. It is distinguish from any other SNC meteorites.

Both WDS and EDS analyses show that the average composition of olivine is Fo73, it of pyroxene is En74Fs22Wo4, it of maskelynite is An53.5Ab47.5.

The petrographic studies indicate that the GRV9927 meteorite is an ultramafic rock formed as a result of fractional crystallization. Its crystallization sequence was follows: the early accumulation of olivine crystals, subsequently the crystallization of low-calcium bronzite and finally the formation of interstitial plagioclase.

The chemical composition of GRV9927 has been analyzed using EDS method. The following features can be recognized in comparison with the SNC meteorites.

1. The major element abundance in GRV9927 is similar to those in SNC meteorites. The SiO_2 contents in GRV9927 are close to those in shergottites and the Al_2O_3 contents are close to those in ALHA77005. The FeO, MgO, CaO contents are close to ALHA77005 as well and they are intermediate between those in nakhlite and Chassigny.

2. Just like other SNC meteorites the high ratio of Fe/(Fe+Mg) in GRV9927 indicates that it also formed from differentiated parent magmas.

3. As *Ma et al*. (1982) reported the compositions of major and some minor elements among shergotties have certain colinearities and ALHA77005 and EETA79001B can be combined in various proportions to produce the approximate compositions of the other shergottites[1, 3]. The major element concentrations in GRV9927 can be projected on this plot. They just fall into the range and close to the composition of ALHA77005.

Based on above-mentioned the authors come to the conclusion that the GRV9927 meteorite is similar to ALHA77005 martian achondrite and could be a new member of SNC meteorite clan. The new achondrite provides a rare and unusual sample from the solar system.

References

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