NWA 4757: METAMORPHOSED CARBONACEOUS CM CHONDRITE.

M. A. Ivanova[1], C. A. Lorenz[1], L.V. Moroz[2,3], R. C. Greenwood[4], I. A. Franchi[4] and M. Schmidt[5]. [1]Vernadsky Institute, Kosygin 19, Moscow 119991, Russia. E-mail: venus2@online.ru. [2]Institute of Planetology, University of Münster, Germany. [3] DLR Institute of Planetary Research, Berlin, Germany. [4]The Open University, Milton Keynes, UK. [5]University of Heidelberg, Germany.

Introduction: Beside the Antarctic metamorphosed carbonaceous chondrites (MCCs) of the Belgica 7904 group [1] there are two non-Antarctic MCCs found in a hot desert: Dhofar 225 and Dhofar 735 [2,3]. They differ from typical CM2 chondrites in mineralogy, oxygen isotopic compositions, H_2O content, bulk chemistry, and infrared spectra of their matrices [3,4]. The recently discovered carbonaceous chondrite NWA 4757 has similarities with both groups of carbonaceous chondrites, MCC and CM2. Here we report preliminary results on its petrography, mineralogy, H_2O and C contents, oxygen isotopic compositions and synchrotron-based infrared microspectroscopy (SIRM) to characterize the hydration states of thel NWA 4757 matrix minerals.

Results: The meteorite consists of fine-grained matrix material, round objects sometimes with haloes of phyllosilicate and carbonates, and relict aggregates embedded in altered matrix. Silicates from the objects in the meteorite correspond to serpentine in composition. We analyzed the only grain of olivine found in the matrix. The minor phases are ilmenite, chromite, sulfides, kamacite, taenite, tetrataenite, phosphates, Ca,Mg-carbonates. Olivine is characterized by Fa_{10}, CaO 0.06; MnO 0.19 (wt. %). Chemical composition of the matrix corresponds to serpentine, but with high analytical totals. Bulk contents (wt.%) were H_2O - 1.9, C - 0.68. Average bulk oxygen isotopic compositions are $\delta^{18}O$ = +27.0‰; $\delta^{17}O$ = +14.5‰; $\Delta^{17}O$ = 0.48‰. The SIRM study showed that the matrix is depleted in hydrated silicates and is dominated by Fe-rich fine-grained olivines.

Discussion: In texture and opaque mineral asembledge, NWA 4757 belongs to the CM chondrites. Bulk H_2O content is lower than that of CM2 chondrites and corresponds to MCCs. The oxygen isotopic composition of NWA 4757 is out of the range of typical CM2, and is even heavier than that of MCCs. The matrix is more homogeneous in chemical composition than that of MCCs and CM2 chondrites. Unlike matrices of typical CM2 chondrites [4], the matrix of NWA 4757 is depleted in hydrated silicates and is dominated by Fe-rich fine-grained olivines. In this respect it resembles previously studied matrices of MCCs, Dhofar 225 and Dhofar 735 [4]. Furthermore, the SIRM study also shows that several objects and halos consisting of phyllosilicates and carbonates are strongly hydrated, probably caused by terrestrial weathering. Trace element distribution will help to understand this. Based on this preliminary study, NWA 4757 belongs to the MCCs, and appears to be a mixture of dehydrated matrix material and strongly hydrated objects. If very hydrated objects and rims formed in deep space, they could survive only if the matrix had been dehydrated before their incorporation into the parent asteroid of NWA 4757.

References : [1] Ikeda Y. 1992. *Proceedings of NIPR Symposium on Antarctic Meteorites:***5**, 49-73. [2] Ivanova M.A. et al. 2004. Abstract #5113. *Meteoritics & Planetary Science:*39. [3] Ivanova M.A. et al. 2005. Abstract #1054. 36th Lunar Planetary Science Conference, [4] Moroz L.V. et al. 2006. *Meteoritics & Planetary Science*:**41**, 1219-1230.