The 2001 Omani-Swiss meteorite search campaign and recovery of Shergottite Sayh Al Uhaymir 094

Conference or Workshop Item

THE 2001 OMANI-SWISS METEORITE SEARCH CAMPAIGN AND RECOVERY OF SHERGOTTITE SAYH AL UHAYMIR 094. B.A. Hofmann[1], E. Gnos[2], M. Hauser[2], L. Moser[2], A. Al Kathiri[3] and I.A. Franchi[4], [1]Natural History Museum Bern, Bernastr. 15, CH-3005 Bern, Switzerland (beda.hofmann@nmbe,unibe.ch), [2]Institute of Mineralogy and Petrology, Bern University, Baltzerstr. 1, CH-3012 Bern, Switzerland, [3]Ministry of Commerce and Industry, P.O. Box 18205, Salalah, Sultanate of Oman, [4]Planetary Sciences Research Institute, Open University, Milton Keynes, MK7 6AA, UK.

Introduction: Many meteorites have recently been recovered in Oman by anonymous collectors [1] [2]. Between january 22 and february 15, 2001 two teams consisting of the first 5 authors conducted a meteorite search in the central desert areas of Oman (58 man days). The main aim was to assess the potential of known and new collection areas as a basis for systematic future meteorite searches in Oman. A total of 185 meteorites (comprising 455 fragments) with a total weight of nearly 32 kg were recovered. The weight of individuals ranged from 0.3 g to 3.4 kg. An additional 10.3 kg stone was recovered by AAK in March. As we plan to study issues of weathering, soils below meteorites and reference soil samples were collected as well. For each find, the distribution of fragments was documented. Our samples comprise apparently unpaired stones but also many individuals likely belonging to meteorite showers. One area of dense finds appears to represent at least two overlapping strewnfields. The location of previously known strewn fields (SaU 001, Dho 005) was verified. Meteorite collection areas typically are sand-poor limestone plains belonging to the Miocene Fars group. Recognition of meteorites is difficult where desert-varnished cherts are locally abundant.

Sayh al Uhaymir 094: The most prominent find is SaU 094, a 233 g shergottite most likely paired with SaU005/008/051. The SaU shergottite represents one of the largest Mars meteorites and the only one with a well documented strewnfield (approx. 1.5x2.5 km). The petrology of SaU 094 is virtually identical with that of the other SaU shergottites. Veins and pockets of vesicular shock melt are abundant; vesicles up to 3 mm in size are clearly visible in X-ray tomograms (Fig. 1). Shock melt products comprise green, partially recrystallized silicate glass, globular Fe-sulfide, and a third, Fe-rich, now oxidized phase intimately associated with globular Fe-sulfide. The latter phase probably is identical with an oxidized Fe-rich phase also present in the groundmass (shocked Fe-carbonate?). Terrestrial weathering resulted in calcite veining which is particularly abundant in the outer 5-15 mm of the stone, and in irregularly distributed partial oxidation of pyrrhotite (including partial transformation to marcasite). Oxygen isotope measurements on a surface chip sample yield $\delta^{17}O$ 2.51‰, $\delta^{18}O$ 4.29‰, $\Delta^{17}O$ 0.28‰. The low $\Delta^{17}O$ value probably is influenced by the presence of terrestrial calcite. SaU 094 is very similar to Dar al Gani 476 in many respects including the presence of abundant pentlandite exsolutions in pyrrhotite. Direct comparison of the surface of both meteorites shows that SaU 094 is less weathered and retains a thin black fusion crust. - Classification of the other meteorites recovered in 2001 is in progress.

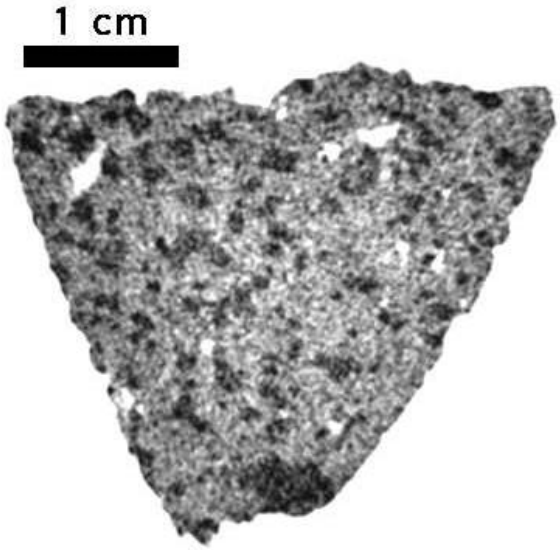

Fig. 1. Typical high-resolution X-ray tomogram of Sayh al Uhaymir 094 showing olivine crystals (dark) in groundmass and vesicles (bright).

References: [1] Grossman J. N. and Zipfel J. (2000) *MAPS, 35,* A199-A225. [2] Grossman J. N. and Zipfel J. (2001) *MAPS, 36.*