

THE GENTLE SEPARATION OF PRESOLAR SiC GRAINS FROM METEORITES AND THEIR ANALYSIS BY TOF-SIMS.

J. Tizard¹, T. Henkel¹, and I. Lyon¹. ¹University of Manchester, M13 9PL, UK. Julia.M.Tizard@stud.man.ac.uk

Introduction: Methods of extracting presolar SiC grains using acid dissolution have been developed over the past 17 years and isotopic analyses of thousands of grains separated by this method have been published over recent years [1]. However, there is evidence that the grains may be chemically altered by the harsh acids [2] and any non-refractory coat or inclusions to the grains would also be destroyed. This has led to the development of other methods for identifying grains [3]. This paper describes the development of a new and efficient method of SiC separation by non corrosive methods, and the preliminary results from TOF-SIMS analysis of the SiC isolated by this new procedure.

SiC Isolation: SiC grains were successfully enriched from ~6 ppm abundance in the Murchison whole rock to 0.7 % abundance in the 0.5-5 micron 3.14-3.19 g/cc separation using a tailored non-corrosive separation scheme. Freeze-thaw disaggregation with ultra pure water was used to break up the rock followed by systems of size separations in isopropanol-water mix and density separations in heavy liquids to isolate the SiC. Cameca SX100 Electron Microprobe (EMPA) elemental mapping in Si, C, Mg and O of the 3.14-3.19 g/cc density separation was used to identify SiC grains candidates from silicates. Subsequent EDS analysis of individual grain candidates revealed a ~80 % success rate in identifying true SiC. From an initial 32 mg of the Murchison meteorite 0.2 mg was left in the 0.5-5 micron, 3.14-3.19 g/cc density separation. A small aliquot from this separation was spread over a 10 mm² gold foil. Approximately 120 SiC grains were found over a 1.8 mm² area analysed so far.

TOFSIMS Analysis: Isotopic analysis of the SiC grains from this new separation procedure has been carried out by a new Time-of-Flight Secondary Ion Mass Spectrometer (TOFSIMS) [4] at Manchester. SiC grains from the KJG Murchison acid residue donated by S Amari and R Lewis [5] have also been analysed. Data collected to date is consistent with mainstream SiC. Results from these grains and additional data from both gentle and acid residue separations will be presented.

References: [1] Hoppe P. and Zinner E. 2000. *Journal of Geophysical Research-Space Physics* 105:10371-10385. [2] Henkel T. et al. 2001. *Meteoritics and Planetary Science* 36:A78. [3] Messenger S. and Bernatowicz T. 2001. *Journal of Geophysical Research* 90:1151-1154. [4] Tizard J. et al. 2003. *Meteoritics and Planetary Science* 38:A5129. [5] Amari S. et al. 1994. *Geochimica and Cosmochimica Acta* 58:459-470.