MEASURING THE ISOTOPIC PROPERTIES OF INTERPLANETARY DUST PARTICLES

F.J. Stadermann (Technical University THD, Hilpertstr. 31, Geb. H, D-64295 Darmstadt, Germany)

The isotopic composition of extraterrestrial material can give important clues to its origin and history, as has been demonstrated extensively on meteoritic inclusions. In the study of interplanetary dust particles (IDPs) isotopic measurements are particularly valuable for a second reason: Isotopic compositions that differ significantly from normal, terrestrial values (i.e., isotopic anomalies) unequivocally prove the extraterrestrial origin of a given particle. This is especially important, since all collections of IDPs (from the stratosphere or the Antarctic ice) suffer severely from contamination with terrestrial material.

The method of choice for the determination of isotopic compositions of IDPs is secondary ion mass spectrometry (SIMS) because of its high sensitivity and good lateral resolution. So far isotopic anomalies in IDPs have been found for H, N, and O. The most widespread anomalies in H and N have been attributed to ion-molecule reactions in cold interstellar molecular clouds. With SIMS imaging the lateral distribution of isotopic compositions in IDPs can be visualized. These analyses showed that some of the H anomalies are located in sub-micron sized "hot-spots", suggesting preserved pre-solar grains. The O anomalies have only been observed in few IDPs with refractory compositions, resembling those of Ca-Al-rich inclusions in meteorites, which also show similar anomalies.

Submittal Information:

1. Frank J. Stadermann
   Technical University (THD)
   Hilpertstr. 31 (Geb. H)
   D-64295 Darmstadt, Germany
   Telephone: 06151-813223
   Fax: 06151-813222
   Email: DF6S@HRZPUB.TH-DARMSTADT.DE

2. Session: PS2/02, Micrometeorites and IDPs


4. Only standard equipment

5. Oral presentation

6. Does not apply
PS2 Extraterrestrial Materials
2 Micrometeorites and IDPs

TUESDAY, 4 APRIL

Lecture Room: SAS Rostock

Chairperson: Flynn, G.

11:30 KURAT, G.; WALTER, J.; BRANDSTÄTTER, F.; KOEBERL, C.; MAURETTE, M.
Mineralogy and chemistry of Antarctic micrometeorites (Invited Paper)

12:00 BRADLEY, J.P.; VANDERWOOD, T.B.; MAURETTE, M.; ENGRAND, C.; PETIT, J.R.; KURAT, G.
Search for 0.5-5 mm chondritic grains in Antarctic ice cores

12:15 WALTER, J.; KURAT, G.; KOEBERL, C.; MAURETTE, M.
Chondrules in interplanetary dust

12:30 ENGRAND, C.; WALTER, J.; ZOLENSKY, M.; MICHEL-LEVY, M.C.; KURAT, G.; MAURETTE, M.
Electron microprobe studies of stratospheric and Antarctic micrometeorites (Y)

12:45 GRESHAKE, A.; KLOCK, W.; BISCHOFF, A.; ARNDT, P.; MAETZ, M.
Pulse-heating experiments simulating atmospheric entry heating of micrometeorites

13:00 LUNCH

Chairpersons: Kurat, G. & Klock, W.

14:00 MANN, I.
On the different contribution of comets to the IDPS and to the interplanetary dust cloud

14:15 HILCHENBACH, M.; HOVESTADT, D.; KLECKER, B.; MÖBIUS, E.
Interplanetary dust particles: a possible source of singly charged heavy ions upstream of the Earth's bow shock

14:30 BORG, J.; BIBRING, J.-P.; MAAG, C.
The COMRADE experiment as part of the ESEF instrument

14:45 GRADY, M.M.; SEXTON, A.; WRIGHT, J.P.
Impacts into MLI-blankets of Eureca

15:00 KLOCK, W.
Mineralogical and chemical studies of interplanetary dust (Invited Paper)

15:30 ARNDT, P.; JESSBERGER, E.K.; MAETZ, M.; TRAXEL, K.
Comprehensive laboratory analyses of interplanetary dust particles

15:45 FLYNN, G.J.; SUTTON, S.R.; BAJT, S.
Chemical compositions of large stratospheric dust particles: comparison with stratospheric IDPs and polar micrometeorites

16:00 STEPHAN, T.; ROST, D.; JESSBERGER, E.K.
High resolution multielement analysis of interplanetary dust using TOF-SIMS

16:15 STADERMANN, F.J.
Measuring the isotopic properties of interplanetary dust particles (Invited Paper)

16:45 END OF SESSION

17:00 PS Meeting in SAS Rostock