

Thursday, March 22, 2012
POSTER SESSION II: COSMIC DUST:
INTERSTELLAR, INTERPLANETARY, AND COMETARY MATERIAL
6:00 p.m. Town Center Exhibit Area

Füri E. Marty B.

[Helium Isotopes in Stardust Cometary Matter: A Possible Record of the Early Evolution of the Solar System](#) [#1220]

We reevaluate the origin of noble gases in Comet 81P/Wild 2. Helium-isotope ratios of Stardust samples fall between PSN and modern SW values, suggesting that cometary matter has recorded several snapshots of the early evolution of the solar system.

Palma R. L. Pepin R. O. Westphal A. Schlutter D. Gainsforth Z.

[Helium and Neon in "Blank" Stardust Aerogel Samples](#) [#1076]

Helium and neon concentrations and compositions were measured in 49 samples of "blank" aerogel from Stardust cell C2044. Five samples show interesting compositions that if related to the Track 41 impactor indicate a complicated parent particle.

Ogliore R. C. Butterworth A. Gainsforth Z. Huss G. R. Nagashima K. Stodolna J. Westphal A. J.

[Sulfur Isotope Measurements of a Stardust Fragment](#) [#1670]

We report S-isotopic measurements (^{32}S , ^{33}S , ^{34}S , ^{36}S) of a pyrrhotite grain from Comet Wild 2 returned by NASA's Stardust mission.

Snead C. J. McKeegan K. D. Burchell M. Kearsley A. T.

[Oxygen Isotope Measurements of Simulated Wild 2 Impact Crater Residues](#) [#2238]

We discuss techniques developed to analyze the oxygen-isotopic compositions of Stardust impact crater residues, and we present results of such measurements of simulated impact crater residues of several mineral standards.

Nakashima D. Ushikubo T. Joswiak D. J. Brownlee D. E. Matrajt G. Kita N. T.

[High Precision Oxygen Three-Isotope Analysis of Crystalline Silicates of Comet Wild 2: A Genetic Link to Chondrules and AOAs in CR Chondrites](#) [#2196]

Eight ferromagnesian Wild 2 particles show diverse oxygen isotope ratios and chemistry: ^{16}O -rich (Mn-rich forsterite) and ^{16}O -poor (FeO-rich and -poor), similar to AOAs and chondrules in CR chondrites. This suggests a genetic link to CR chondrites.

Nakashima D. Brownlee D. E. Joswiak D. J. Kita N. T. Ushikubo T.

[Techniques for Ion Microprobe Analysis of Tiny Particles: Combination of FIB Marking and \$^{16}\text{O}^-\$ Ion Imaging and Sample Mounts Using Indium](#) [#2216]

We developed new analytical protocols for high-precision oxygen-isotope analyses of tiny particles: use of indium to mount microtomed potted butt samples and combination of FIB marking and $^{16}\text{O}^-$ secondary ion imaging.

Silver E. Lin T. Vicenzi E. Toth M. Westphal A. Beeman J. Haller E. E. Burchell M.

[Advanced Chemical Analysis of Cometary Material and Interstellar Dust Using a Microcalorimeter and a Low Vacuum Scanning Electron Microscope](#) [#2511]

A microcalorimeter and an environmental scanning electron microscope modified to permit material-selective, gas-mediated, electron beam-induced etching are coupled to chemically analyze cometary particles and interstellar dust returned by Stardust.

White A. J. Ebel D. S. Greenberg M.

[A New Experimental Deconvolution Technique for 3-Dimensional Laser Confocal Microscopy of Stardust Tracks in Aerogel](#) [#1542]

We report successful three-dimensional deconvolution of Zeiss LSM 710 confocal microscopy data using an experimentally determined point spread function to obtain more accurate three-dimensional measurements of Stardust track morphology, grain size, and grain location.

Butterworth A. Becker N. Gainsforth Z. Lanzirotti A. Newville M. Proslie T. Stodolna J. Sutton S. Tyliszczak T. Westphal A. J. Zasadzinski J.

[*New Homogeneous Standards by Atomic Layer Deposition for Synchrotron X-Ray Fluorescence and Absorption Spectroscopies*](#) [#2666]

New homogeneous multi-layer film standards synthesized using Atomic Layer Deposition and characterized by multiple analytical methods, including ellipsometry, RBS, TEM, and synchrotron x-ray fluorescence and absorption spectroscopies.

Price M. C. Burchell M. Kearsley A. T. Cole M. J.

[*Alteration and Formation of Organic Molecules via Hypervelocity Impacts*](#) [#1755]

Raman spectral analyses of residues from polystyrene impactors on Al foils show the presence of intact polystyrene, carbon, and an unknown organic that is tentatively identified as a metal phthalate created during the hypervelocity impact.

Merouane S. Djouadi Z. d'Hendecourt L. Borg J.

[*IDPs' Silicate 10 \$\mu\text{m}\$ Signature Versus Aliphatic 3.4 \$\mu\text{m}\$ Features: A Key to Their Origin?*](#) [#1777]

Based on a quantification of olivine and pyroxene in the 10 μm band of IDPs, we investigate a possible link between their mineral and aliphatic components. This is probably reflecting an evolutionary pathway of the studied particles.

Matrajt G. Flynn G. J. Brownlee D. E. Joswiak D. J.

[*Coordinated FTIR and TEM Study of the Organic Material in the Stardust Particle Febo and the IDP Chochu*](#) [#2576]

We compared the organic carbonaceous material in a stardust particle and an IDP and found that texturally the material is identical but the IR data in the IDP shows many more peaks and variability than the SD particle.

Stodolna J. Gainsforth Z. Butterworth A. Westphal A. J.

[*TEM/STXM Characterization of Preserved Primitive Material from the Comet Wild2*](#) [#1214]

We report the discovery of preserved primitive fine-grained material from Comet 81P/Wild 2. It is composed of silica-rich amorphous matrix embedded with iron sulfides and silicates. An enstatite whisker is identified inside the matrix.

Frank D. R. Zolensky M. E. Le L.

[*Using the Fe/Mn Ratio of FeO-Rich Olivine in Wild 2, Chondrite Matrix, and Type IIA Chondrules to Disentangle Their Histories*](#) [#2748]

We compare our data for FeO-rich olivine in matrix and Wild 2 to that of type IIA chondrules. This comparison yields implications for chondrule fragmentation, and the mixing and transport of fine-grained material to the outer solar system.

Rietmeijer F. J. M.

[*Sub-Micron Pyrrhotite-Taenite Grains in the Nucleus of Comet 81P/Wild 2*](#) [#1294]

Chemical modeling predicts the presence of single pyrrhotite-taenite grains in the nucleus of Comet Wild 2 to explain the presence of the observed high-Ni FeNiS nanograins found in low-Mg silica glass.

Flynn G. J. Sutton S. R. Wirick S. Lanzirotti A. Rao W.

[*Fe- and Cr-XANES Analyses of Large Cluster Interplanetary Dust Particles*](#) [#1089]

Fe-XANES shows three large CI-like cluster IDPs consist of a mixture of at least two Fe-bearing phases, each dominated by Fe with a valance near Fe^{2+} . The absence of Fe-metal suggests the anhydrous IDP parent body is different from Wild 2.

Wopenka B. Floss C.

[*Raman and Laser-Induced Fluorescence Signatures of Isotopically Primitive and Normal IDPs*](#) [#1191]

Isotopically primitive IDPs have lower laser-induced fluorescence and wider Raman D bands than normal IDPs. Combined Raman/SIMS study suggests that there may be multiple carbonaceous carriers for the N-isotopic anomalies in primitive IDPs.

Kohout T. Suuronen J.-P. Kallonen A. Cuda J. Badjukov D. D. Skala R.
[Physical Properties and X-Ray Microtomography of the Micrometeorites from Novaya Zemlya, Russia](#) [#2332]
Physical properties and internal structure of cosmic dust in the form of six ~100- μm -sized micrometeorites, collected in the Novaya Zemlya glacier in Russia, were investigated using X-ray microtomography (XMT).

Schreiber K. Stadermann F. J. Floss C. Rea D. Lyle M.
[Search for Extraterrestrial Particles in Sediment from the South Pacific Bare Zone](#) [#1112]
The low sedimentation rate in the South Pacific Bare Zone suggests it may be a promising site for enhanced accumulation of extraterrestrial matter. Our initial search of a core from this region identified five particles with chondritic compositions.

Yabuta H. Itoh S. Noguchi T. Sakamoto N. Hashiguchi M. Abe K. Tsujimoto S. Kilcoyne A. L. D. Okubo A. Okazaki R. Tachibana S. Terada K. Nakamura T. Nagahara H.
[Finding of Nitrogen-Rich Organic Material in Antarctic Ultracarbonaceous Micrometeorite](#) [#2239]
An ultracarbonaceous micrometeorite (UCMM) has been investigated using isotope microscopy, FIB-SEM, STXM, and TEM. C- and N-XANES spectra of N-rich organic region in the UCMM were similar to those of several Comet Wild 2 dust particles.

Engrand C. Dobriä E.
[Bulk Oxygen Isotopic Composition of Antarctic Micrometeorites: Effect of Atmospheric Entry](#) [#2636]
The bulk O isotopic compositions of Antarctic micrometeorites are broadly compatible with that of carbonaceous chondrites, but systematic heavy O isotopic enrichments due to atmospheric entry were observed in partially melted particles.

Baecker B. Cordier C. Folco F. Trierloff M. Cartwright J. A. Ott U.
[Noble Gas Inventory of Micrometeorites from the Transantarctic Mountains](#) [#1824]
We have initiated a comprehensive survey of noble gases (He, Ne, Kr, Ar, and Xe) in micrometeorites (MMs) at the MPIC, Mainz. At present, we have obtained noble gas results for 11 MMs. Solar wind and spallogenic contributions are evident in some MMs.

Yano H. Hirai T. Olamoto C. Fujii M. Tanaka M. IKAROS-ALADDIN Team
[The Multiple Round Trip Measurement of Cosmic Dust Flux Completed by Ikaros-Aladdin in the Inner Planetary Region](#) [#1632]
ALADDIN onboard the IKAROS solar sail detected >2500 dust impacts in 16 months. It made ~1.5 round trips between Earth and Venus orbits and unveiled the finest dust flux above 1 μm in the region compared to records of 1970–1990s.