Tuesday, March 15, 2005
INTERPLANETARY DUST
8:30 a.m.   Marina Plaza Ballroom

Chairs: S. Messenger
         M. J. Genge

8:30 a.m.   Westphal A. J. * Bradley J. P.
Synthesis of GEMS from Shock-accelerated Crystalline Dust in Superbubbles:
Model and Predictions [#1904]
We have recently proposed a model of GEMS formation from shock-accelerated crystalline dust
in superbubbles. Here we briefly review the main points of the model, and suggest tests that will
either prove or rule out this hypothesis.

8:45 a.m.   Keller L. P. * Messenger S.  Christoffersen R.
GEMS Revealed: Spectrum Imaging of Aggregate Grains in Interplanetary Dust [#2088]
Spectrum imaging of GEMS grains reveals that most are aggregates of smaller subgrains with
diverse compositions that formed in the early solar nebula.

9:00 a.m.   Brownlee D. E. * Joswiak D. J.  Bradley J. P.  Matrajt G.  Wooden D. H.
Cooked GEMS—Insights into the Hot Origins of Crystalline Silicates in Circumstellar Disks
and the Cold Origins of GEMS [#2391]
GEMS were heated to provide insight into the thermal formation to crystalline silicates from
primitive amorphous silicate materials. The sub-solidus transformation of amorphous material in
GEMS provides insight into the origin of GEMS as well as crystalline silicates around other stars.

9:15 a.m.   Messenger S. * Keller L. P.
Association of Presolar Grains with Molecular Cloud Material in IDPs [#1846]
We have identified two presolar silicate grains associated with interstellar molecular cloud material
in IDPs. Most of the grains associated with the D hotspot are high temperature crystalline components
that likely formed in the solar system.

9:30 a.m.   Floss C. * Stadermann F. J.
NanoSIMS D/H Imaging of Isotopically Primitive Interplanetary Dust Particles [#1423]
Hydrogen isotopic imaging of isotopically primitive IDPs shows that D anomalies occur both as
small discrete hotspots and as larger micron-sized regions, perhaps suggesting different carrier phases.
No correlation of H and N anomalies was found.

9:45 a.m.   Flynn G. J. * Lanzirotti A.  Sutton S. R.
Chemical and Mineralogical Analyses of Particles from the Stratospheric Collections Coinciding with
the 2002 Leonid Storm and the 2003 Comet Grigg-Skjellerup Trail Passage [#1148]
Eight stratospheric particles collected coincident with Earth’s passage through the dust trail of comet
Grigg-Skjellerup, analyzed by synchrotron X-ray fluorescence and diffraction, show a wide diversity
of chemical and mineralogical compositions.

10:00 a.m.  Genge M. J. *
Multiple Chondrule Populations Within Micrometeorites [#1306]
Composite particles, containing igneous objects and fine-grained matrix, strongly suggest that at least
two chondrule populations are sampled by micrometeorites — a carbonaceous chondrite-like and an
ordinary chondrite-like population.
10:15 a.m. Joswiak D. J. * Matrajt G.  Brownlee D. E.
_Electron Energy Loss Spectroscopy Measurements of Ferric Iron in Cronstedtite from a Hydrated IDP: Comparison to Ferric Iron Contents in Cronstedtite in CM Chondrites_ [#2340]
EELS measurements of ferric iron in cronstedtite in a hydrated IDP show a large range in ferric/ferrous ratios. This contrasts with a narrow range observed in cronstedtite in CM chondrites and may imply oxidation changes after equilibration.

10:30 a.m. Nakamura K. * Messenger S.  Keller L. P.
_TEM and NanoSIMS Study of Hydrated/Anhydrous Phase Mixed IDPs: Cometary or Asteroidal Origin?_ [#1824]
We report a combined mineralogical and isotopic study of an unusual anhydrous IDP that contains minor hydrous phases. This IDP was found to have $^{15}$N enrichments that reach $+900\%$. These observations suggest that some minor aqueous processing may have occurred in Kuiper belt objects.

10:45 a.m. Toppani A. * Robert F.  Libourel G.  de Donato P.  Barrès O.  d'Hendecourt L.  Ghanbaja J.
_Experimental Evidence for Condensation of 'Astrophysical' Carbonate_ [#1894]
We have experimentally shown that carbonates can be formed by non-equilibrium condensation using only gas phase species. Such scenario can explain their presence in planetary nebulae and in protostellar environments free of large parent bodies.

11:00 a.m. Dai Z. R. * Bradley J. P.  Erni R.  Browning N.
_High-Resolution Electron Energy-Loss Spectroscopy (HREELS) Using a Monochromated TEM/STEM_ [#2110]
The NASA SRLIDAP funded monochromated TEM/STEM is now operational at LLNL. Preliminary data is shown for the analysis of individual interplanetary dust particles.

11:15 a.m. Rietmeijer F. J. M. * Borg J.  Rotundi A.
_Revisiting $C_{60}$ Fullerene in Carbonaceous Chondrites and Interplanetary Dust Particles: HRTEM and Raman Microspectroscopy_ [#1225]
HRTEM and microRaman spectroscopy can detect minute amounts of $C_{60}$ fullerene in cometary IDPs and carbonaceous chondrites prior to destruction by interactions with the atmosphere. Stardust samples must be protected to avoid fullerene deterioration.

11:30 a.m. Clemett S. J. * McKay D. S.
_Ultra-Fast Laser Desorption/Laser Ionization Mass Spectrometry for the Organic Analysis of Stardust Sample Return_ [#2295]
We have developed a new generation ultra-fast laser desorption/laser ionization mass spectrometer, recently completed at NASA Johnson Space Center, capable of performing _in situ_ organic analysis of Stardust samples at the ppm detection level.