

Friday, March 15, 2002
ORIGINS: STARDUST TO PHYLLOSILICATES
8:30 a.m. Salon A

Chairs: A. K. Speck
B. S. Meyer

Kemper F. Jäger C. Waters L. B. F. M. Henning Th. Molster F. J.* Barlow M. J. Lim T. de Koter A.
Carbonates in Dust Shells Around Evolved Stars [#1193]

We report the first extrasolar detection of carbonates, around evolved stars. The conditions exclude aqueous alteration as a formation mechanism. Thus, an alternative formation mechanism exists, which may also be important in the solar system.

Speck A. K.* Kemper F. Whittington A. G. Molster F. J. Herwig F.
Formation of Presolar Crystalline Silicates: The Effect of ^{26}Al [#1197]

We investigate whether radiogenic heating by decay of ^{26}Al can cause the crystallization of amorphous silicate grains in the outflows of evolved stars. The high crystallinity of disk source might be explained by this mechanism.

Cameron A. G. W.*

Meteoritic Isotopic Abundance Effects from R-Process Jets [#1112]

Supernovas of the kind that triggered the formation of the solar nebula, through their r-process jets, appear to have provided distinct meteoritic abundance signatures: r-process peaks at xenon and the rare earth hump, and a p-process peak at Mo and Ru.

Meyer B. S.* Clayton D. D. Chellapilla S. The L-S.

Nucleon-Alpha Particle Disequilibrium and Short-Lived r-Process Radioactivities [#1994]

r-Process yields can be extremely sensitive to expansion parameters when a persistent disequilibrium between free nucleons and alpha particles is present. This may provide a natural scenario for understanding the variation of heavy and light r-process isotopes in different r-process events.

Haghighipour N.* Boss A. P.

Dynamical Evolution of Solids in a Marginally Gravitationally Unstable Disk [#1376]

We study the radial migrations of small bodies subject to Epstein and Stokes drags in the terrestrial planet region of a marginally gravitationally unstable solar nebula in order to investigate the implications of their migrations for collisional coagulation.

Weidenschilling S. J.*

Self-consistent Models of the Dusty Subdisk in the Solar Nebula: Implications for Meteorites [#1230]

The space density and relative velocities in a particle layer in the nebular midplane are constrained by shear-induced turbulence. Chondrule formation appears to require transient deviations from steady-state conditions.

Lindsay B. D.* Hyde T. W.

Protoplanetary Migration and Creation of Scattered Planetesimal Disks [#1097]

The relationship between protoplanet migration and the formation of the Kuiper Belt (planetesimal disk scattering) is examined.

Hahn J. M.* Ward W. R.

Secular Resonance Sweeping in a Self-gravitating Planetesimal Disk, with Application to the Kuiper Belt [#1930]

Nagasawa and Ida (2000) have shown that scanning secular resonances can excite large eccentricities and inclinations. We reexamine this phenomena for a planetesimal disk having mass, and it is shown that such excitation is muted by wave propagation.

Leya I.* Wieler R. Halliday A. N.

Modeling the Production of Be-7, Be-10, and Al-26 by Spallation Reactions in the Early Solar System [#1268]

Modeled production rates for ^7Be , ^{10}Be , and ^{26}Al in CAIs from the early solar system are presented. The new results simultaneously describe the measured data and are therefore strong indications of a spallogenic origin for these isotopes.

Clayton R. N.*

Photochemical Self-Shielding in the Solar Nebula [#1326]

Isotopic variations in meteoritic oxygen and nitrogen may be due to isotopic self-shielding during the photolysis of CO in the nebular gas. Solar oxygen should be ^{16}O -rich, like CAIs.

Harker D. E.* Desch S. J.

Annealing of Pre-Cometary Silicate Grains in Solar Nebula Shocks [#2002]

Comets contain crystalline silicate grains which could only have formed at high temperatures, not generally experienced by comets. We test the hypothesis that amorphous silicates were annealed by shock waves in the solar nebula.

Ciesla F. J.* Lauretta D. S. Cohen B. A. Hood L. L.

Adiabatic Shock Waves in Icy Regions of the Solar Nebula: Implications for Origins of Phyllosilicate Minerals in Primitive Meteorites [#1243]

We re-examine the possibility that phyllosilicate minerals, such as those found in the chondrule rims in CM chondrites, formed in the solar nebula. Specifically, we consider the formation in the presence of water vapor produced by a shock wave that could have also formed chondrules.

Colwell J. E.* Mellon M. T.

Experimental Studies of Collisions in Planetary Rings and Protoplanetary Disks [#1757]

Collisions in planetary rings and between forming planetesimals can occur at low impact velocities. We report the results of ground- and space-based impact experiments into simulated regolith at speeds below 2.5 m/s.