

Monday, March 7, 2011
COSMOCHEMICAL ORIGINS I:
PHOTOCHEMISTRY, TRANSPORT, AND DISK EVOLUTION
8:30 a.m. Waterway Ballroom 4

Chairs: James Lyons
Don Brownlee

- 8:30 a.m. Smith R. L. * Pontoppidan K. M. Young E. D. Morris M. R.
[Observational Signatures of Carbon Isotope Ice-Gas Fractionation Towards Solar-Type Protostars](#) [#1281]
 We find a direct correlation in $[^{12}\text{CO}]/[^{13}\text{CO}]$ gas and the CO ice fraction toward several YSOs, suggesting that ^{12}CO - ^{13}CO ice-gas fractionation may affect protostellar carbon isotopic evolution, and help explain the peculiar solar system $[^{12}\text{C}]/[^{13}\text{C}]$.
- 8:45 a.m. Young E. D. * Schauble E. A.
[Carbon Isotope Fractionation Between CO Gas and CO Ice with Implications for \$^{12}\text{C}/^{13}\text{C}\$ of the Interstellar Medium and the Early Solar System](#) [#1323]
 A model for carbon-isotope fractionation between CO ice and gas is presented. The model includes a self-consistent portrayal of the kinetics of partitioning of ^{12}C and ^{13}C between CO ice and gas. Ice-gas carbon exchange may be a primary control for $^{12}\text{C}/^{13}\text{C}$.
- 9:00 a.m. Chakraborty S. * Davis R. Jackson T. L. Ahmed M. Thieme M. H.
[Anomalous Isotope Effect in VUV Photodissociation of Hydrogen Sulfide: Implications for Chondrite and Chondrule Isotopic Data](#) [#1569]
 Mass-independent sulfur-isotopic compositions have been observed during H_2S photolysis with VUV photons from the ALS synchrotron. The role of VUV photolysis of H_2S will be discussed to explain the anomalous sulfur-isotopic composition found in chondrites.
- 9:15 a.m. Shi X.-Y. * Yin Q.-Z. Luo Z.-H. Huang H. Ng C.-Y.
[Testing "Self-Shielding" Model with Laboratory Experiment for the Oxygen Isotope Evolution in the Early Solar Nebula — A Progress Report](#) [#2705]
 We report our first results for CO self-shielding experiment using high resolution VUV laser and molecular beam technique at very low temperature. Slope 1 line is obtained for 105.17 nm band, thought to be responsible for ~60% of CO self-shielding for the oxygen isotopes.
- 9:30 a.m. Lyons J. R. *
[Modeling CO Photolysis Experiments and Disk Chemistry Using Line-by-Line Spectra for the Oxygen Isotopologues of CO](#) [#2780]
 Full line-by-line spectra are used to simulate CO photolysis experiments and solar nebula chemistry. For the disk, a temperature-dependence of the 'slope' is predicted which may be useful in ruling out some self-shielding models.
- 9:45 a.m. Hashizume K. * Takahata N. Naraoka H. Sano Y.
[Concurrent Births of the Organic Matter and the Oxygen Isotope Anomaly in the Solar Nebula](#) [#1153]
 The coherent enrichments of $^{17,18}\text{O}$ and ^{13}C detected among organic grains extracted from an Antarctic CR2 chondrite suggest that the non-mass-dependent O-isotope fractionation occurred in a warm environment such as the envelope of the solar nebula.

- 10:00 a.m. Brownlee D. E. * Joswiak D. Matrajt G.
[*Large Coarse-Grained Solid Particles in Comets — A Ubiquitously Distributed Component in the Solar Nebula?*](#) [#2235]
 The large solid particles in comet Wild 2 may represent a large particle component that was distributed to all early bodies in the solar nebula. This hypothesis is tested by comparing large solid particles from a variety of cometary sources.
- 10:15 a.m. Ciesla F. J. *
[*Particle Residence Times in Solar Nebula Environments: Chemical Evolution Due to Radial Motions in an Evolving Disk*](#) [#1101]
 We develop a Monte Carlo model to calculate particle paths in an evolving solar nebula and to quantify the time spent in different environments. The model is used to understand the nebular processing experienced by meteoritic components.
- 10:30 a.m. Jacquet E. * Gounelle M. Fromang S.
[*Transport and Preservation of Calcium-Aluminum-Rich Inclusions: The Role of the Dead Zone*](#) [#1091]
 We show that preservation of CAIs until chondrite accretion is achieved in the dead zone of the disk. We also propose initial transport of CAIs via expansion of a compact disk.
- 10:45 a.m. Perry J. D. * Gostomski E. Matthews L. S. Hyde T. W.
[*The Influence of Monomer Shape on Aggregate Morphologies in First Stage Protoplanetary Development*](#) [#2019]
 Studies modeling the coagulation of dust particles typically assume spherical monomers. While this assumption simplifies the problem it may not always be valid. This study compares morphology of aggregates built from spheres and ellipsoids.
- 11:00 a.m. Davison T. M. * Collins G. S. Ciesla F. J. O'Brien D. P.
[*The Energy Budget of Planetesimal Collisions: A Quantitative Analysis*](#) [#2530]
 Monte Carlo simulations have been used to determine the total energy available from impacts on planetesimal parent bodies. We will present a quantitative comparison of the available heat from collisions and the decay of short-lived radionuclides.
- 11:15 a.m. Boss A. P. *
[*Planet Formation Processes in a Marginally Gravitationally Unstable Disk Around a Solar-Mass Protostar*](#) [#2205]
 Marginally gravitationally unstable disks provide a natural mechanism for the rapid transport radially inward and outward of short-lived radioactivities and refractory grains, but they might also form giant planets by disk instability.
- 11:30 a.m. Minton D. A. * Levison H. F.
[*Why is Mars Small? A New Terrestrial Planet Formation Model Including Planetesimal-Driven Migration*](#) [#2577]
 The small size of Mars is a persistent problem for planet-formation models. We present new simulations for Mars formation that include the effect of planetesimal-driven migration, a critical mechanism that has been left out of previous studies.
- 11:45 a.m. Walsh K. J. * Morbidelli A. Raymond S. N. O'Brien D. P. Mandell A. M.
[*The Asteroid Belt and Mars' Small Mass Explained by Large-Scale Gas-Driven Migration of Jupiter*](#) [#2585]
 We present a scenario to reproduce Mars' small mass, as well as the S/C dichotomy of the asteroid belt, by taking into account the inward-then-outward gas-driven migration of Jupiter that is predicted by hydrodynamical simulations.