

Monday, March 19, 2012

CHEMICAL PROCESSES IN THE SOLAR NEBULA AND LATEST GENESIS RESULTS

8:30 a.m. Waterway Ballroom 6

Chairs: Gerardo Dominguez
James Lyons

- 8:30 a.m. Huss G. R. * Nagashima K. Burnett D. S. Jurewicz A. J. G. Olinger C. T.
[*A New Upper Limit on the D/H Ratio in the Solar Wind*](#) [#1709]
We report measurements of D/H in solar wind from the Genesis B/C- and H-array collectors. Our new upper limit on D/H in the solar wind is a factor of >10 lower than previous sample-based estimates.
- 8:45 a.m. Desch S. J. *
[*Snow Lines in Externally Photoevaporated Protoplanetary Disks*](#) [#2770]
I calculate the effect of external photoevaporation on the radial distribution of water in a protoplanetary disk. I find the outward flow of gas prevents ice from drifting back into the inner disk even though temperatures are cold enough for ice.
- 9:00 a.m. Pascucci I. * Sterzik M. Alexander R. Sacco G.
[*Evidence for Disk Photoevaporation Driven by the Central Star — Impact on Planetary Architectures*](#) [#1155]
We present the first observational evidence for disk photoevaporation driven by the central star and discuss the implications of star-driven photoevaporation on the architecture of planetary systems.
- 9:15 a.m. Yang L. * Ciesla F. J. Alexander C. M. O'D.
[*The D/H Ratio of Water in a Forming and Evolving Protoplanetary Disk*](#) [#2023]
We explore how the D/H ratio of water would evolve in the solar nebula by coupling our model of transport in a growing protoplanetary disk with a kinetic study of chemical reactions involving hydrogen-bearing species.
- 9:30 a.m. Alexander C. M. O'D. * Bowden R. Fogel M. L. Howard K. T. Herd C. D. K.
[*The Origin of Water in Chondrites and Volatiles in the Terrestrial Planet Region*](#) [#1929]
The D/H ratios of water in CCs, Ocs, and Rs are inconsistent with models in which chondritic water and/or chondrites formed in the outer solar system.
- 9:45 a.m. Nuth J. A. III * Johnson N. M.
[*Will Organic Synthesis Within Icy Grains or on Dust Surfaces Within the Primitive Solar Nebula Completely Erase the Effects of Photochemical Self Shielding?*](#) [#1495]
Self shielding relies on the differential dissociation of CO and sequestration of ¹⁶O-rich CO. Organic synthesis in the solar nebula starts with CO and hydrogen on grain surfaces, producing hydrocarbons and water. ¹⁶O-rich CO cannot be sequestered.
- 10:00 a.m. Chakraborty S. * Yanchulova P. Thiemens M. H.
[*Laboratory Observation of Mass-Independent Oxygen Isotopic Composition in Solid Silicates Through Gas Phase Reaction: Cosmochemical Implications*](#) [#2300]
This abstract describes experiments of the gas phase oxidation reaction of SiO to form SiO_x and present isotope results from the gas and solid phase products and reactants. Mass-independent oxygen isotopic composition was observed in silicates.
- 10:15 a.m. Dominguez G. * Jackson T. Nunn M. Basov D. Thiemens M. H.
[*Low Temperature Mass-Independent Ozone Formation on Cold Surfaces*](#) [#2403]
We report the results of laboratory O₂ photolysis experiments that provide the first evidence that the formation of O₃, an important precursor to H₂O formation, on cold (T~32 K) surfaces is a mass-independent process.

- 10:30 a.m. Ozima M. * Suzuki T. K. Yamada A.
[Genesis SW-Oxygen Corrected for SW/SUN Isotopic Fractionation is Closer to Earth Oxygen than to CAI](#) [#1194]
The Genesis project gave a convincing isotopic composition of oxygen in bulk solar wind sample, but correction for putative isotopic fractionation between SW and the Sun is still needed to conclude the solar oxygen-isotopic composition.
- 10:45 a.m. Shi X. * Yin Q.-Z. Wiens R. Ng C.-Y.
[Isotope Composition of Atomic Oxygen and Branching Ratio from CO Predissociation: Implications for Oxygen Isotope Evolution in the Early Solar Nebula](#) [#1403]
We investigated the “self-shielding” effects by detecting atomic ^{16}O , ^{17}O , and ^{18}O as fragments from CO predissociation. Our photonion imaging results may help explain the different rare isotope enrichment between N and O reported by the Genesis team.
- 11:00 a.m. Lyons J. R. *
[CO Self-Shielding by Various Stellar Sources](#) [#2818]
CO self-shielding with two stellar sources is considered. Even though the stars have very different spectra in the FUV region, both predict oxygen isotope slopes ~ 0.9 .
- 11:15 a.m. Chakraborty S. Jackson T. L. Muskatel B. H. Ahmed M. Levine R. D. Thiemens M. H. *
[Nitrogen Isotopic Fractionation in VUV Photodissociation of \$\text{N}_2\$: Implications for the Early Solar System](#) [#2347]
In this abstract we present the first experimentally determined N-isotopic fractionations during VUV photolysis of N_2 using the ALS synchrotron.
- 11:30 a.m. Milam S. N. * Charnley S. B.
[Observations of Nitrogen Fractionation in Prestellar Cores: Nitriles Tracing Interstellar Chemistry](#) [#2618]
Fractionated material found in primitive materials is suggested to originate from interstellar chemistry. We present observations of nitrogen and carbon fractionation in dense cores and will discuss these results as compared to primitive materials.
- 11:45 a.m. Wirström E. S. * Charnley S. B. Cordiner M. A. Milam S. N.
[Spin-State-Dependent Ion-Molecule Chemistry as the Origin of \$^{15}\text{N}\$ and D Isotopic Anomalies in Primitive Matter](#) [#2457]
We present calculations showing how different ortho/para ratios in interstellar H_2 can explain the highly variable D and ^{15}N enrichments observed in meteoritic material and IDPs.