

Tuesday, March 13, 2007
SOLAR NEBULA COMPOSITION
1:30 p.m. Crystal Ballroom B

Chairs: T. R. Ireland
B. Zanda

- 1:30 p.m. Lyons J. R. * Boney E. Marcus R. A.
Temperature-dependent CO Self-Shielding in the Solar Nebula [#2382]
 A line-by-line self-shielding calculation for CO band #31 was performed at temperatures from 10 K to 1000 K. Results thus far indicate that self-shielding at very high temperatures may be possible.
- 1:45 p.m. Davis A. M. *
Oxygen Isotopes in the Solar System: Whither Self-Shielding [#2260]
 Synthetic spectra for UV absorption of CO were calculated. Self-shielding seems unlikely to explain non-mass-dependent oxygen isotopic compositions at high temperature, but is viable for low temperature, at least for the line most commonly used to explain molecular cloud observations.
- 2:00 p.m. Chakraborty S. * Ahmed M. Thieme M. H.
Wavelength Dependent Isotopic Fractionation in CO Photolysis: Experimental Findings Relevant to the Solar Nebula [#1264]
 Isotopically selective dissociation of CO is invoked as a significant photochemical process in molecular clouds to explain the observed oxygen isotopic anomaly in solar system objects. This abstract deals with oxygen isotopic fractionation at various wavelengths relevant to the solar nebula.
- 2:15 p.m. Smith R. L. * Young E. D. Morris M. R. Pontoppidan K. M.
Detection of Rare CO Isotopologues in a Protostellar Disk: Towards an Astronomical Approach to Understanding Oxygen Isotopes in the Solar System [#2293]
 We report detection of C¹⁷O and other rare CO species in a protostellar disk. This represents a first step towards using astronomical data to test the plausibility of CO self shielding as a cause of oxygen isotope variation in the early solar system.
- 2:30 p.m. Ireland T. R. * Holden P. Norman M. D. Mya J. Asplund M.
Soils Ain't Soils: The Preservation of Solar Wind in Metal Grains from the Lunar Regolith [#1449]
 Oxygen isotopes from two more lunar soils have been analysed. Neither has an implanted component and all oxygen isotope compositions measured are normal. Solar wind exposure must be independently ascertained for each grain.
- 2:45 p.m. Gounelle M. * Meibom A.
The Oxygen Isotopic Composition of the Sun as a Test of the Supernova Origin of ²⁶Al and ⁴¹Ca in the Early Solar System [#2146]
 Short-lived radionuclides such as ²⁶Al and ⁴¹Ca might have been delivered in the protoplanetary disk by a type II supernova. We show that upcoming measurements of the oxygen isotopic composition of the Sun can help test this hypothesis.
- 3:00 p.m. Zanda B. * Hewins R. H.
The Oxygen Mixing Model: End-Members of Mixing Trends in the 3-Isotope Plot [#2161]
 Correlations between modal abundances and bulk chemical and oxygen isotopic analyses define end-members involved in the mixing of chondrite groups. The petrologic components were not mixed at random but first into batches which were then mixed into chondrites.

- 3:15 p.m. Jacobsen S. B. * Yin Q. Z. Petaev M. I.
The Oxygen Isotope Evolution of Our Galaxy: Implications for the Interpretation of Early Solar System Heterogeneities [#1804]
The observed range of oxygen isotopes in early solar system materials can be explained with a simple galactic evolution model for oxygen isotopes. What is required is a mean residence time of the oxygen in the dust of the interstellar medium of about 0.5 to 1.3 Ga.
- 3:30 p.m. Boss A. P. *
Spatial Heterogeneity of Short-lived Radioisotopes and of Stable Oxygen Isotopes in the Solar Nebula [#1017]
Mixing and transport in a marginally gravitationally unstable disk naturally homogenizes initially strongly spatially heterogeneous isotopic distributions to a dispersion of only 10% about the mean value, consistent with the role of ^{26}Al as a chronometer and with stable oxygen isotope anomalies.
- 3:45 p.m. Ranen M. C. * Jacobsen S. B.
Ba, Nd, and Sm Isotopic Variations in Solar System Materials [#2060]
This work investigates mixing relationships between nucleosynthetic components in bulk planetary bodies in order to determine origins of isotopic heterogeneities. High precision *p*-process Ba data will be presented for a variety of planetary bodies.
- 4:00 p.m. Simon J. I. * DePaolo D. J.
Non-mass Dependent Ca Isotopic Differences Between Meteorites and the Earth [#1752]
Correlation between ^{40}Ca and ^{142}Nd isotopic effects for two primitive chondrites, the Earth, and ALH 84001. The ^{40}Ca variation is too large to be due to radioactive decay, and must reflect solar system heterogeneity.
- 4:15 p.m. Nakamura N. * Fujitani T. Kimura M.
A New Isotope Tracer for the Early Solar System Processes: Stable Chlorine Isotopes and Distribution of Cl-bearing Phases in Chondrites [#1707]
New results of stable chlorine isotope compositions and distribution of Cl-carriers in chondrites are reported. Each group shows unique Cl-isotope variations, suggesting that there existed several Cl-isotope reservoirs in the early solar system.
- 4:30 p.m. Meibom A. * Krot A. N. Robert F. Mostefaoui S. Russell S. S. Petaev M. I. Gounelle M.
The Nitrogen and Carbon Isotopic Composition of the Solar Nebula [#1256]
The nitrogen and carbon isotopic compositions of the Sun inferred from a high temperature solar nebula condensate.