

Thursday, March 17, 2005
OXYGEN IN THE SOLAR SYSTEM
1:30 p.m. Salon C

Chairs: T. R. Ireland
J. W. Delano

- 1:30 p.m. Clayton R. N. *
Disequilibrium Oxygen Chemistry in the Solar Nebula [#1711]
 Oxygen isotopic disequilibrium in chondrules and CAIs implies oxygen chemical disequilibrium as well. Reaction with photochemically-produced oxygen atoms may lead to the observed oxidation states of primitive materials, without resort to special mechanisms, such as dust/gas enrichment.
- 1:45 p.m. Lyons J. R. *
The $\delta^{17}\text{O}/\delta^{18}\text{O}$ Ratio Associated with CO Photodissociation in the Solar Nebula [#2037]
 Photodissociation of CO produces nebular water with a $\delta^{17}\text{O}/\delta^{18}\text{O}$ slope comparable to the measured slope in CAIs if H_2 absorption effects during CO are accounted for during CO self-shielding.
- 2:00 p.m. Ireland T. R. * Holden P. Norman M. D.
The Oxygen Isotopic Composition of the Sun and Implications for Oxygen Processing in Molecular Clouds, Star-forming Regions, and the Solar Nebula [#1572]
 The solar oxygen isotopic composition is depleted in ^{16}O by 54‰ relative to terrestrial. This composition can be explained by molecular cloud predissociation and gas-solid fractionation during formation of the accretion disk.
- 2:15 p.m. Chakraborty S. * Thiemens M. H.
Evaluation of CO Self-Shielding as a Possible Mechanism for Anomalous Oxygen Isotopic Composition of Early Solar System Materials [#1113]
 CO self-shielding is likely a very modest process. Preliminary experiments show large mass independent effect in the photochemistry of CO at around 150 nm thus excited state chemistry of CO may play an important role in the early solar system process.
- 2:30 p.m. Aléon J. * Robert F. Duprat J. Derenne S.
Extreme Oxygen Isotopic Anomalies from Irradiation in the Early Solar System [#1890]
 We have discovered SiO_2 -rich grains in the Murchison meteorite with ^{17}O and ^{18}O excesses of about two orders of magnitude, which we attribute to spallation in the gas by ^3He -rich impulsive solar flare type particles emitted by the young Sun.
- 2:45 p.m. Pahlevan K. * Stevenson D. J.
The Oxygen Isotope Similarity of the Earth and Moon: Source Region or Formation Process? [#2382]
 We propose that the similar oxygen isotope composition between the Earth and Moon is likely to reflect post-impact processes that would tend to homogenize the terrestrial and proto-lunar material.
- 3:00 p.m. Akaki T. * Nakamura T
Oxygen Isotope Microanalysis of Enveloping Compound Chondrules in CV3 and LL3 Chondrites [#1559]
 SIMS data for enveloping compound chondrules in CV3 and LL3 chondrites indicate that they were formed by multiple heating events during which the O-isotope compositions of chondrules and nebular gas reservoirs have not changed significantly.
- 3:15 p.m. Guan Y. * Lin Y. Leshin L. A.
Oxygen Isotope Distribution in Anorthite-Spinel-rich Inclusions from the Ningqiang Carbonaceous Chondrite [#2027]
 We report oxygen isotope heterogeneity among individual mineral components in anorthite-spinel-rich inclusions from the Ningqiang carbonaceous chondrites, with emphasis on the observation and discussion of ^{16}O -poor perovskite in CAIs.

- 3:30 p.m. Delano J. W. *
Apollo 14 High-Ti Picritic Glass: Oxidation/Reduction by Condensation of Alkali Metals [#1081]
Volcanic fire-fountaining was the setting for extreme alkali enrichment and FeO reduction during the eruption of a high-Ti picritic magma in the region of the Apollo 14 landing site.
- 3:45 p.m. McCanta M. C. *
Potential Effects of Melt Composition on Redox Ratio: Implications for Oxygen Fugacity Measurements [#1754]
An experimental comparison of the effects of oxygen fugacity and composition on melt redox ratio is presented. Although melt composition does influence the redox ratio in some cases, oxygen fugacity is shown to have a substantially greater effect.
- 4:00 p.m. Sutton S. R. * Newville M.
Vanadium K XANES of Synthetic Olivine: Valence Determinations and Crystal Orientation Effects [#2133]
We report vanadium K XANES measurements on synthetic olivine grains and glass and describe inferred vanadium valences. The variations due to crystal orientation are shown to be subtle.
- 4:15 p.m. Delaney J. S. * Dyar M. D. Gunter M. E. Sutton S. R. Lanzirotti A.
Broad Spectrum Characterization of Returned Samples: Orientation Constraints of Small Samples on X-Ray and Other Spectroscopies [#1130]
Orientation effects present significant analytical challenges for spectroscopic techniques that assess multivalent cations. Here, we quantify errors associated with using synchrotron microXANES to study anisotropic pyroxenes.
- 4:30 p.m. Keefner J. W. * Mackwell S. J. Kohlstedt D. L.
Dunite Viscosity Dependence on Oxygen Fugacity [#1915]
Deformation experiments were performed on Åheim dunite over ranges of temperature, stress, and solid state buffer to investigate the dependence of viscosity on oxygen fugacity. The strength difference between experiments demonstrates a power law exponent of 0.19.