Thursday, March 13, 2008
POSTER SESSION II: PLANETARY DIFFERENTIATION
6:30 p.m. Fitness Center

Jackson C. R. M. Filiberto J. Treiman A. H. Le L.
Phase Equilibria Effects and Partitioning of Nickel Using the Humphrey Composition of the Gustev Basalts **[#1495]**
This study has twp foci: (1) Documenting Ni's effect on near-liquidus phase equilibria in a martian basalt; (2) determining whether Ni partitioning models calibrated by Earth sourced data are accurate in martian systems.

Cottrell E. Fei Y. Ricolleau A. Prakapenka V.
Nickel Partitioning Between Liquid Metal and Liquid Silicate in the LHDAC: Techniques for Achieving Reliable Partition Coefficients **[#2267]**
We present new techniques for the attainment of equilibrium partition coefficients in the laser-heated diamond anvil cell and new data for Ni partitioning.

Hill E. Domanik K. Drake M. J.
Cation Distribution Between Forsterite and Metal Alloy at High Temperatures: Implications for the Cooling Rates of Pallasites **[#1415]**
We report metal/olivine partition coefficients for Ni as functions of temperature, composition and fO_2. Such partition coeffients are essential to interpreting zoning profiles in pallasitic olivines in terms of cooling rates.

Acuff K. M. Danielson L. R. Righter K. Lee C. T. A.
Partitioning of Phosphorus and Molybdenum Between the Earth's Mantle and Core and the Conditions of Core Formation **[#2329]**
Metal/silicate partition coefficients for Mo and P have been measured at high temperatures and indicate that concentrations of Mo and P in the Earth's primitive upper mantle can be explained by a high temperature origin.

Langlade J. A. Schmidt M. W. Liebske C.
Oxygen Solubility in Iron Melts at High Pressures and Temperatures: Experimental Constraints on Terrestrial Planetary Core Formation **[#1872]**
Solubility of oxygen was investigated experimentally in Fe-rich portions of Fe-FeO and Fe-O-S systems at HP and HT (15 and 23 GPa, 1500°–2000°C). Our results indicate an increase of oxygen solubility with increasing pressure at eutectic conditions.

Stewart A. J. van Westrenen W. Schmidt M. W. Günther D.
A Crystal Lattice Strain Approach to Predicting Element Partitioning Between Solid and Liquid Metal **[#2158]**
We show the crystal-lattice strain model commonly exploited for silicate mineral-melt partitioning is applicable to metallic systems too, enabling development of new predictive partitioning models applicable to planetary core crystallization.

Trail D.
Samarium and Neodymium Metal-Silicate Partition Coefficients and their Bearing on Earth's Missing Sub-Chondritic $^{142}Nd/^{144}Nd$ Reservoir **[#1694]**
Through the application of Sm and Nd metal-silicate partitioning data, it can be shown that some of the terrestrial sub-chondritic $^{142}Nd/^{144}Nd$ reservoir may reside in the core.

Kadik A. A. Litvin Yu. A.
The Role of Hydrogen and Oxygen Fugacity on the Incorporation of Nitrogen in Reduced Magmas of the Early Earth's Mantle **[#1037]**
According to experiments at 4 GPa, 1550°C, significant amounts of nitrogen (NH_3, NH_4) could have been incorporated in the early Earth by dissolution in a magma ocean, under fO_2 conditions relevant to those prevailing during metal segregation.

Danielson L. R. Righter K. Sutton S. R. Newville M. Le L.
L-Edge XANES Measurements of the Oxidation State of Tungsten in Iron Bearing and Iron Free Silicate Glasses **[#2075]**
W^{4+} is relevant to core formation but W^{6+} may also occur. Silicate glasses show W^{6+} above IW and mixed valence below IW. The transition to W^{4+} only, appears to happen at or below IW-2 for iron free systems, but below IW-3 for iron bearing systems.

Teng F. Z. Dauphas N. Helz R. T.
Iron Isotope Fractionation During Planetary Differentiation **[#2148]**
Iron isotopes fractionate during basaltic differentiation at both whole-rock (~0.2) and mineral (~1.1) scales, due to the change of Fe oxidation states. This suggests that the Fe isotopic composition of basalts may not represent that of their sources.

Colson R. O. Hay E. Larson A. Cota A.
Effect of Carbon Monoxide on Liquidus Temperatures of Silicate Melts at 1-atm Pressure **[#1310]**
Carbon monoxide gas has a significant and previously unrecognized influence on phase equilibria at one-atmosphere pressure. The liquidus temperatures of some silicate compositions vary by more than 100°C as a function of CO in the gas phase.

Petaev M. I. Jacobsen S. B. Remo J. L. Adams R. G. Sasselov D. D.
Experimental Study of High-Energy Processing of Protoplanetary Materials: Implications for the Post-Giant-Impact Earth **[#1850]**
Our experimental data suggest that the silicate portion of the post-giant-impact terrestrial magma ocean might have been enriched in FeO and capable of very rapid metal-silicate equilibration.

Tachinami C. Senshu H. Ida S.
Life-Time of Intrinsic Magnetic Field of Terrestrial Planets in Habitable Zone **[#1546]**
We carried out numerical simulations on thermal evolution of various-sized rocky planets to estimate the life-time of magnetic field. According to our results, planet should be no heavier than 1.4 Earth mass to sustain magnetic field for 4.5 G.y.

Minitti M. E. Fei Y. Bertka C. M.
Experimental Investigation of Geophysically-constrained Martian Mantle Compositions **[#2113]**
We conducted high-pressure experiments on geophysically-constrained martian mantle compositions to examine their ability to produce melts with affinities to martian igneous lithologies (e.g., martian meteorites, basalts identified by MER and TES).