Tuesday, March 13, 2007
POSTER SESSION I: PLANETARY DIFFERENTIATION
6:30 p.m. Fitness Center

Valencia D. O'Connell R. J. Sasselov D. D.
Scaling of Convection and Plate Tectonics in Super-Earths **[#2417]**
We assess the role of mass in the mode of convection. We find that massive terrestrial planets will have thinner lithosphere, faster convective velocities and higher stress regimes. This is a scenario that is suitable for the subduction of the lithosphere and hence, the onset of convection.

Senshu H.
Size Effect on the Formation of Magnetic Field for Rocky Planets **[#2213]**
We developed numerical model on the thermal evolution of various-sized rocky planets. Our result indicates that rocky planets much larger than Earth could not form magnetic field via dynamo action.

Beck P. Goncharov A. F. Strushkin V. Militzer B. Hemley R. J.
Measurements of Thermal Diffusivities Under Planetary Interiors Pressure and Temperature Conditions **[#2205]**
We report here on a new method aimed to measure heat transport properties at extreme pressures and temperatures.

Parmentier E. M. Elkins-Tanton L. Schoepfer S.
Melt-Solid Segregation, Fractional Magma Ocean Solidification, and Implications for Longterm Planetary Evolution **[#1655]**
Solidification of a magma ocean will be affected by the rate at which dense solid mineral grains can settle out of a turbulently convecting fluid. We describe laboratory experiments that address the question of whether and for how long turbulent convection can suspend particles.

McKinnon W. B.
Differentiation of the Galilean Satellites: Are They Really Iron Poor? **[#2435]**
The internal structures of Jupiter's large moons — Io, Europa, Ganymede, and Callisto — can be usefully compared with those of the terrestrial planets, but the evolutionary paths to differentiation taken are in striking contrast to those presumed to have governed the inner planets.

Malavergne V. Berthet S. Righter K.
Formation of CaS-MgS in Enstatite Chondrites and Achondrites as a Function of Redox Conditions and Temperature: Constraints on Their Evolution in a Planetesimal and in a Proto-Planet **[#1737]**
The main objective of this experimental study is to understand the formation and evolution of (Mg,Mn,Ca,Fe)S with pressure, temperature but also with redox conditions in order to simulate the evolution of these phases in a small planetary body.

Das A. Srinivasa G.
Rapid Melting of Planetesimals Due to Radioactive Decay of Al-26 Decay: A Case Study of Planetary Bodies with Variable Aluminum Abundance **[#2370]**
Rapid melting of planetesimals has been modelled using standard heat diffusion equation under the conditions of variable Al content.

Kleine T. Aciego S. Bourdon B. Nimmo F. Zipfel J.
How Rapidly Did Mars Accrete? Constraints from Hf, Th, and W in Chondrites **[#2348]**
We present precise Hf and Th concentration data for chondrites that allow us to substantially improve the Hf-W age for the formation of Mars.

Filiberto J.
A New Martian Basalt Source Region Model Composition Calculated Based on Terrestrial Ferropicrites as Analogs to Martian Basalts **[#1338]**
Element abundance ratios do not uniquely distinguish martian basalts from terrestrial ferropicrites. Therefore, a new technique to calculate the shergottite source region composition was developed. This technique emphasizes small differences between martian basalts and terrestrial ferropicrites.

Remo J. L. Adams R. G. Petaev M. I. Jacobsen S. B. Sasselov D. D.
Laser Simulation of High P-T Planetary Processes **[#1847]**
We describe a new experimental technique involving high energy density lasers that allows measurements of equations of state and momentum coupling coefficients at very high T and P in recovered targets to be made.

Petaev M. I. Jacobsen S. B. Remo J. L. Adams R. G. Sasselov D. D.
Experimental Study of High-Energy Processing of Protoplanetary Materials **[#1822]**
The partitioning of Ni between silicate and metal melts created by laser shocks of metal-dunite targets points to a very rapid metal-silicate equilibration at high T and P comparable with those estimated for the post-giant impact proto-Earth.

Mann U. Frost D. J. Becker H. Rubie D. C. Shearer C. K. Agee C. B.
Effect of Pressure on the Partitioning of Highly Siderophile Elements Between Liquid Fe-Alloy and Peridotitic Liquid **[#1544]**
This study evaluates metal-silicate equilibration in a magma ocean as a possible explanation for the HSE inventory of the Earth's mantle. Experimental results indicate that pressure decreases the siderophile character of the HSE's Ru, Rh, Pd, Pt and Re.

Channon M. Garber J. Danielson L. R. Righter K.
Liquid Phases of the Richardton H5 Chondrite at High Pressures and Temperatures **[#1456]**
High pressure and temperature experiments were conducted on the Richardton H5 chondrite, which is hypothesized to resemble the bulk composition of an FeO-rich Earth. The purpose is to provide new constraints regarding the nature of the primitive mantle.

Kadik A. A. Litvin Yu. A.
Magmatic Transport of Carbon, Hydrogen and Nitrogen Constituents from Reduced Planetary Interiors **[#1020]**
In the light of experimental data we argue that magma in reduced environment at in area of the Fe-Si alloy stability could form melts containing dissolved both oxidized, and reduced components of hydrogen and carbon species.

Danielson L. R. Righter K. Sutton S. Newville M. Le L.
The Oxidation State of Tungsten in Iron Bearing and Iron Free Silicate Glasses: Results from W L-Edge XANES Measurements **[#2113]**
Knowledge of the oxidation state of W over a wide range of f_{O_2} is critical to understanding the oxidation state of the mantle and core formation processes. W occurs as W^{6+} above ~IW-1. The transition between W^{4+} and W^{6+} occurs just below IW-1.

Witt-Eickschen G. Palme H. O'Neill H. St. C. Allan C.
The Abundances of Volatile Trace Elements in the Earth's Mantle: New Evidence from Analyses of Mantle Xenoliths **[#1536]**
We have determined abundances of volatile chalcophile elements in Earth's mantle rocks. Indium is lithophile and its abundance is higher than that of elements of similar volatility, implying high contents of volatile elements in the Earth's mantle.

Albarède F. Blichert-Toft J. Harrison M. T.
The Age of the Earliest Continental Crust **[#1216]**
Although our preferred interpretation calls for the Jack Hills zircons to be younger than 4.25 Ga, the reassessment of their Hf model ages emphasizes that an enriched crust, likely but not necessarily granitic, formed within the first 100–200 My of Earth's history.

Schmidt G.
Estimated Mass of Iron Meteorites Contributing to Highly Siderophile Element and Ni Inventory of the Earth Crust **[#1214]**
The HSE and Ni systematics of the Earth upper continental crust closely resembles IIIAB iron meteorites and pallasites. Assuming that bulk Ni in the upper crust is extraterrestrial in origin, this corresponds to a volume of 6.55×10^{20} cm^3 and thus a sphere with a radius of about 54 ± 4 km.

Bennett V. C. Brandon A. D. Hiess J. Nutman A. P.
Coupled ^{142}Nd,^{143}Nd and ^{176}Hf Isotopic Data from 3.6–3.9 Ga Rocks: New Constraints on the Timing and Composition of Early Terrestrial Chemical Reservoirs **[#2139]**
Coupled ^{142}Nd-^{176}Hf data from early Archean rocks indicate very early and heterogeneous terrestrial silicate differentiation, likely unrelated to continental crust formation.

Jacobsen S. B. Ranen M. C.
The $^{146,147}Sm$-$^{142,143}Nd$ Chronometer and the Timescales of Early Planetary Differentiation **[#2269]**
Complexities in the ^{146,147}Sm-^{142,143}Nd system of Earth, Mars and the Moon suggest that igneous rocks that sample their mantles were derived from mixtures due to mantle convection and that simple static models of magma ocean layers in the lunar and martian mantles should be abandoned.

Georg R. B. Halliday A. N.
Isotopic Fractionation of Silicon During Terrestrial Core Formation **[#1070]**
We present new high precise Si isotope data for different silicate reservoirs within the solar system. Our data show that chondrites, Mars and Vesta are isotopically similar, whereas Earth and Moon are offset from the chondritic value.