

Thursday, March 18, 2004
TERRESTRIAL PLANETS: BUILDING BLOCKS AND DIFFERENTIATION
1:30 p.m. Salon C

Chairs: T. A. Rushmer
F. Albarede

- 1:30 p.m. Norman M. * McCulloch M. O'Neill H. Brandon A.
Magnesium Isotopes in the Earth, Moon, Mars, and Pallasite Parent Body: High-Precision Analysis of Olivine by Laser-Ablation Multi-Collector ICPMS [#1447]
 The Earth, Moon, Mars, and differentiated asteroids share a common Mg isotopic reservoir, implying limited variation in the proportion of refractory material contributing to the terrestrial planets.
- 1:45 p.m. Scott E. R. D. *
Meteoritic Constraints on Collision Rates in the Primordial Asteroid Belt and Its Origin [#1990]
 This study shows that many meteorite parent bodies, unlike Vesta, experienced early intense bombardment. Surprisingly, meteorites lend support to the hypothesis that an Earth-mass of planetary embryos and planetesimals accreted in the asteroid belt.
- 2:00 p.m. Becker H. * Horan M. F. Walker R. J. Gao S. Lorand J.-P. Rudnick R. L.
New Constraints on the Origin of the Highly Siderophile Elements in the Earth's Upper Mantle [#1310]
 An improved estimate for the highly siderophile element (HSE) composition of the primitive upper mantle (PUM) does not match well with chondrites; however, it shows a remarkably good fit with the HSE pattern of lunar impact melt breccias.
- 2:15 p.m. Blichert-Toft J. Boyet M. Albarède F. *
Further Lu-Hf and Sm-Nd Isotopic Data on Planetary Materials and Consequences for Planetary Differentiation [#1226]
 New Lu-Hf and Sm-Nd results on lunar KREEP basalts, eucrites, angrites, and SNC provide new constraints on the mantle source of the parent magmas and emphasize the role of clinopyroxene vs plagioclase-ilmenite cumulates in the mantle of different planets.
- 2:30 p.m. Ranen M. C. * Jacobsen S. B.
A Deep Lunar Magma Ocean Based on Neodymium, Strontium and Hafnium Isotope Mass Balance [#1802]
 Combined Lu-Hf, Sm-Nd, and Rb-Sr isotopic mass balance supports a large depleted lunar mantle to complement an enriched crust. The easiest way for the mantle to become depleted is through crystallization of a deep magma ocean composed of over 85% of the Moon.
- 2:45 p.m. Sasaki T. * Abe Y.
Partial Resetting on Hf-W System by Giant Impacts [#1505]
 Even if iron splits into small droplets, the perfect equilibration of Hf-W system at a giant impact is extremely difficult because of the rapid development of Rayleigh-Taylor instability. Effects of partial resetting on the chronometer are discussed.
- 3:00 p.m. BREAK
- 3:15 p.m. Jacobsen S. B. * Yin Q.-Z. Petaev M. I.
On the Problem of Metal-Silicate Equilibration During Planet Formation: Significance for Hf-W Chronometry [#1638]
 It has been suggested that the apparent inconsistency of Hf-W chronometry with results from other systems requires a disequilibrium process for Hf-W. Here we show that constraints from other systems are entirely consistent with Hf-W chronometry.

- 3:30 p.m. Chabot N. L. * Campbell A. J. Humayun M.
Solid Metal-Liquid Metal Partitioning of Pt, Re, and Os: The Effect of Carbon [#1008]
The effects of S and C on the relative partitioning of Pt, Re, and Os are found to be quite different. There may be the potential to gain insight into the light element composition of the Earth's core by understanding $D(\text{Pt})$, $D(\text{Re})$, and $D(\text{Os})$.
- 3:45 p.m. Rushmer T. * Humayun M. Campbell A. J.
Siderophile Element Abundances in Fe-S-Ni-O Melts Segregated from Partially Molten Ordinary Chondrite Under Dynamic Conditions [#1850]
Siderophile concentrations in Fe-S-Ni-O liquid dynamically segregated from residual Fe-Ni metal were analyzed at different degrees of partial melting. We present siderophile and partitioning data for various solid metal/liquid metal compositions.
- 4:00 p.m. Vogel I. A. * Palme H.
Activity Coefficients of Silicon in Iron-Nickel Alloys: Experimental Determination and Relevance for Planetary Differentiation [#1592]
Si-activity coefficients in FeNi-alloys were determined as function of T, $f(\text{O}_2)$ and Ni-content. Their relevance for iron meteorite formation is discussed.
- 4:15 p.m. Kegler Ph. * Holzheid A. Rubie D.C. Frost D. Palme H.
Reinvestigation of the Ni and Co Metal-Silicate Partitioning [#1632]
Ni and Co metal-silicate partition coefficients have been determined at pressures from 0.3 to 10 GPa. The decrease in Ni-Fe and Co-Fe exchange coefficients at pressures below 3 GPa is much stronger than above 3 GPa.
- 4:30 p.m. Bailey E. * Drake M. J.
Metal/Silicate Partitioning of P, Ga, and W at High Pressures and Temperatures: Dependence on Silicate Melt Composition [#1613]
We have measured metal/silicate partitions for P, Ga, and W at elevated pressures and temperatures as functions of silicate melt composition. We confirm that partition coefficients are a stronger function of n_{bo}/t for higher valence cations (P, W) than lower (Ga).
- 4:45 p.m. Sanloup C. Fei Y. *
Closure of the Fe-S-Si Liquid Miscibility Gap at High Pressure and Its Implications for Planetary Core Formation [#1298]
We report melting experiments in the Fe-S-Si system conducted in a multi-anvil apparatus at pressures between 10 and 27 GPa and temperatures up to 2343 K. The results have important implications for the differentiation processes of the planets and the composition of their cores.