Tuesday, March 14, 2006
TERRESTRIAL PLANET FORMATION AND DIFFERENTIATION
1:30 p.m. Marina Plaza Ballroom

Chairs: C. A. Hier-Majumder
T. Kleine

1:30 p.m. Machida R. * Abe Y.
Formation of Terrestrial Planets in a Cold Nebula **[#1615]**
Recent studies show that protoplanetary disk is initially opaque, and water condenses at terrestrial planet formation region. Then, planetesimals mainly composed of ice should be formed in this region. Such planetesimals may form water ball planets.

1:45 p.m. Stimpfl M. * de Leeuw N. H. Deymier P. Drake M. J. Walker A. M.
In the Beginning There Was Water and Dust: A Look into Adsorption as a Mechanism to Explain Water in the Inner Solar System **[#1395]**
Atomistic techniques are employed to study the interaction between water and olivine surfaces with the aim to explore if water gas adsorbed onto the dust in the accretion disk could be a possible source for water in the inner solar system.

2:00 p.m. O'Brien D. P. * Morbidelli A. Levison H. F.
Simulations of Terrestrial Planet Formation with Strong Dynamical Friction: Implications for the Origin of the Earth's Water **[#2347]**
With numerical simulations of terrestrial planet accretion for different outer planet configurations, we find that an initially circular and co-planar Jupiter and Saturn are most consistent with the abundance of water on Earth.

2:15 p.m. Kleine T. * Halliday A. N. Palme H. Mezger K. Markowski A.
Hf-W Chronometry of the Accretion and Thermal Metamorphism of Ordinary Chondrite Parent Bodies **[#1884]**
Hf-W data for ordinary chondrites of different petrological type contrain the timescales of accretion and thermal metamorphism. The data indicate that core formation in some asteroids predated the accretion of chondrite parent bodies.

2:30 p.m. Humayun M. * Simon S. B. Grossman L.
Tungsten and Hafnium Distribution in Calcium-Aluminum Inclusions (CAIs) from Allende and Efremovka **[#2338]**
Hf and W distribution in CAI minerals shows that W appears to have diffused into silicates, which has implications for Hf-W chronology.

2:45 p.m. Nimmo F. * Agnor C. B. Raymond S.
Hf/W Isotopic Evolution from N-Body Accretion Simulations: Constraints on Equilibration Processes During Large Impacts **[#1390]**
We incorporate Hf/W isotopic evolution calculations into an N-body accretion code. Matching the observations requires that even the largest impactors undergo re-equilibration with the target mantle.

3:00 p.m. Jacobsen B. * Yin Q.-Z. Tinker D. Lesher C. E.
Tungsten (W) Self-Diffusion and Metal-Silicate Equilibration **[#2410]**
We performed the first of its kind W self-diffusion experiments and apply the results to address the question of metal-silicate equilibration during planet building processes.

3:15 p.m. Berthet S. * Malavergne V. Righter K. Corgne A. Combes R.
The Evolution of the EH4 Chondrite Indarch at High Pressure and Temperature: The First Experimental Results **[#2026]**
To derive constraints on the understanding of early planetary differentiation processes, HP-HT experiments have been performed on the EH4 chondrite Indarch. Melting relations and equilibrium partitioning behavior in this material have been studied.

3:30 p.m. Hier-Majumder C. A. * Hustoft J. W. Solomon S. C.
Core Formation by Percolation of Iron-rich Liquids **[#1329]**
Experimental and numerical modeling evidence supports the hypothesis that core formation in planetesimals and planets can occur by the percolation of iron-rich liquids through a deforming, solid silicate layer that compacts as the liquid core grows.

3:45 p.m. Asahara Y. Rubie D. C. * Frost D. J. Langenhorst F.
Oxygen Solubility in Liquid Iron and Consequences for the Early Differentiation of Earth and Mars **[#1162]**
Oxygen solubility in liquid Fe decreases with pressure up to 10–15 GPa and then increases at higher pressures. The metal-silicate partitioning of oxygen during core formation has a major effect on chemical differentiation of terrestrial planets.

4:00 p.m. Kegler Ph. * Holzheid A. Palme H.
The FeO, NiO and CoO Contents of Solar System Basalts and Their Significance for Core Formation in Planetary Bodies **[#1785]**
The difference in Ni and Co contents of eucrites, lunar and martian basalts can only be understood by considering the recently discovered steep decline of Ni and Co metal-silicate partition coefficients between 1 atmosphere and 5 GPa.

4:15 p.m. Mills N. M. * Agee C. B. Draper D. S.
Metal-Silicate Partitioning of Cesium — Implications for Planetary Core Formation **[#1709]**
These experiments provide a data set for the metal-silicate partitioning of cesium, a mantle-depleted lithophile element, and discuss its implications for core formation processes.

4:30 p.m. Righter K. *
Depletion of Vanadium in Planetary Mantles: Controlled by Metal, Oxide, or Silicate? **[#2259]**
Vanadium can be compatible in both FeNi metal and mantle phases such as spinel, magnesiowustite and garnet. In this paper consideration of depletions due to metal, oxide and silicate are critically evaluated and applied to Earth, Moon, Mars and Vesta.