Monday, March 23, 2009
ORIGIN AND EARLY EVOLUTION OF THE MOON
8:30 a.m. Waterway Ballroom 4

Chairs: **David Kring**
David Draper

8:30 a.m. Jacobsen S. B. * Remo J. L. Petaev M. I. Sasselov D. D.
Hf-W Chronometry and the Timing of the Giant Moon-forming Impact on Earth **[#2054]**
For Hf-W chronometry of the Earth-Moon system (EMS) there are currently two end member options: (i) the formation of the EMS at ~32 Myr or (ii) formation of 90% of the Earth in the first six Myr followed by a very late (~100 Myr) formation of the Moon.

8:45 a.m. Touboul M. * Kleine T. Bourdon B. Nyquist L. Shih C.-Y.
New ^{142}Nd Evidence for a Non-Chondritic Composition of the Moon **[#2269]**
Here we present new Sm-Nd data for lunar rocks that are used to evaluate the significance of the ^{146}Sm-^{142}Nd systematics for constraining the timescale of lunar differentiation and the bulk Nd isotope composition of the Moon.

9:00 a.m. Elardo S. M. * Draper D. S.
Crystallization of a Lunar Magma Ocean: Preliminary Experimental Results **[#1181]**
Though widely accepted, the lunar magma ocean hypothesis has never been fully tested experimentally. Presented here are the preliminary results of experiments conducted on a bulk Moon composition to simulate lunar magma ocean crystallization.

9:15 a.m. Pahlevan K. * Stevenson D. J.
Chemical Fractionation after the Moon-forming Giant Impact **[#2392]**
We test the hypothesis that the lunar mantle is derived from the terrestrial mantle via liquid-vapor fractionation during the afterglow of the giant impact.

9:30 a.m. Zindler A. * Jacobsen S. B.
Isotopic Equilibration of Earth's Mantle and the Moon Subsequent to the Giant Impact? **[#2542]**
The striking oxygen, chromium, and tungsten isotopic similarities between the Earth's mantle and the Moon are discussed and modeled with a 3-box model.

9:45 a.m. Parmentier E. M. *
On the Scale of Lunar Mantle Overturn Following Magma Ocean Fractional Solidification: The Role for Multiple Scales of Convective Motion **[#1781]**
Multiple scales of mantle overturn following magma ocean fractional solidification reconciles the magmatic evolution of the Moon many of its important geological and geophysical characteristics.

10:00 a.m. Longhi J. *
Origin of the Magnesian Suite Cumulates **[#2356]**
Melting calculations on various combinations of rock types formed in the lunar magma ocean suggest that highly magnesian olivine characteristic of magnesian suite cumulates ultimately derives from the earliest dunite cumulates of the magma ocean.

10:15 a.m. Grange M. L. * Nemchin A. A. Pidgeon R. T. Meyer C.
Early History of the Moon: Zircon Perspective **[#1473]**
U-Pb ages of lunar zircons highlight new details in the early history of the Moon, providing a younger limit for the LMO crystallization and indicating that the impact history of the Moon is more complex than the accepted late period of bombardment.

10:30 a.m. Frey H. V. *
Crustal Thickness Evidence for More Previously Unrecognized Large Lunar Basins **[#1687]**
Crustal thickness model data reveal the presence of even more large lunar basins that were previously unrecognized. The total number of lunar basins >300 km diameter may exceed 150, more than three times that determined by photogeologic mapping alone.

10:45 a.m. Wieczorek M. A. Le Feuvre M. *
Did a Large Impact Reorient the Moon? **[#1554]**
More impacts should occur on the Moon's western hemisphere as a result of this body's synchronous rotation. We show that there are more old basins located on the Moon's eastern hemisphere, suggesting that a large impact reoriented the Moon by 180°.

11:00 a.m. Jolliff B. L. * Korotev R. L. Zeigler R. A. Prettyman T. H.
Connecting Lunar Meteorite Dhofar 961 to the South Pole-Aitken Basin Through Lunar Prospector Gamma-Ray Data **[#2555]**
Lunar meteorite Dhofar 961, which contains mafic impact-melt components, is matched to locations within South Pole-Aitken Basin through the 5-degree Lunar Prospector gamma-ray data. Implications for a lower crustal provenance are discussed.

11:15 a.m. Cahill J. T. S. * Lucey P. G. Wieczorek M. A.
The Composition of Lunar Central Peaks Relative to Lunar Samples **[#1222]**
Here we place the modeled mineralogy of lunar impact crater central peaks in the context of the lunar sample collection.

11:30 a.m. Wingo D. R. Cowing K. L.
Recovering High Resolution Lunar Orbiter Images from Analog Tape **[#2517]**
Original FR-900 tape recorders have been refurbished to play, digitize, and store, the original highest resolution images of the Moon. This paper outlines the process and the initial results of our efforts.