Tuesday, March 8, 2011
FORMATION AND EVOLUTION OF THE MOON II:
LUNAR MAGMA OCEAN CRYSTALLIZATION AND PRIMARY CRUST PRODUCTION
8:30 a.m. Waterway Ballroom 6

Chairs: **Linda Elkins-Tanton**
Juliane Gross

8:30 a.m. Elkins-Tanton L. T. * Burgess S. Yin Q.-Z.
The Lunar Magma Ocean: Reconciling the Solidification Process with Lunar Petrology and Geochronology **[#1505]**
Detailed physical and chemical models of fractional solidification of the lunar magma ocean offer solutions to both basalt and picritic glass source region compositions and depths, and to the wide span of ages of highlands materials.

8:45 a.m. de Vries J. * van den Berg A. P. van Westrenen W.
Numerical Convection Modelling of a Compositionally Stratified Lunar Mantle **[#1745]**
Using numerical convection models of a stratified lunar mantle we show that initial layering strongly influences the mantle dynamics. At the meeting results will be shown of the inclusion of composition dependent heat production in these models.

9:00 a.m. Namiki N. *
Lunar Internal Structure Estimated from Local Admittance between Gravity and Topography **[#1277]**
The admittance curves between localized gravity disturbance and topography of lunar basins support classification of the Type I, II, and primary mascon basins.

9:15 a.m. Garrick-Bethell I. * Nimmo F. Wieczorek M. A.
Structure and Formation of the Lunar Farside Highlands: Implications for Global Crustal Evolution **[#2714]**
The shape of the lunar farside highlands suggests tidal heating played a role in the formation and structure of the crust.

9:30 a.m. Perera V. * Garrick-Bethell I.
Lunar Asymmetry: Coincidence of the Degree-1 and Degree-2 Features due to a Rayleigh-Taylor Instability and Reorientation **[#2750]**
We explore some of the possible explanations for the lunar asymmetry, and using the new finding of the farside structure, propose a mechanism that might be able to explain the cause of the asymmetry.

9:45 a.m. Jutzi M. * Asphaug E.
The Lunar Farside Highlands as the Late Accretion of the Moon's Companion **[#2126]**
The most immediate geological feature of the Moon is the terrain and elevation dichotomy. We explore the origin of the lunar dichotomy as a late carapace added by the accretion of a companion moon.

10:00 a.m. Charlier B. * Namur O.
Anorthosite Formation by Plagioclase Flotation in Ferrobasalt and Implications for the Lunar Crust **[#1541]**
The processes related to floating and sinking of plagioclase in the Sept Iles layered intrusion serves as a proxy to refine the crystallization model of the lunar magma ocean and explain the vertically stratified structure of the lunar crust.

10:15 a.m. Sakai R. * Kushiro I. Nagahara H. Ozawa K. Tachibana S.
FeO and Refractory Elements of Lunar Magma Ocean Constrained by Condition of Anorthosite Crust Formation **[#1636]**
The bulk composition of the lunar magma ocean was constrained by developing a new model to satisfy the physics and chemistry of the magma ocean that formed the upper crust exclusively consisting of anorthosite with the thickness of several tens km.

10:30 a.m. Uemoto K. * Ohtake M. Haruyama J. Matsunaga T. Yokota Y. Nakamura R. Morota T. Yamamoto S. Kobayashi S. Iwata T.
Geological Structure from Anorthosite Distribution of the Lunar South Pole-Aitken Basin Based on Data Derived from SELENE Multiband Imager **[#1722]**
SPA basin is one of the biggest basins on the lunar far side. We analyzed the geological structure of this basin by investigating the distribution of anorthosite within this basin and comparing the results with the topographic data.

10:45 a.m. Borg L. E. * Connelly J. N. Boyet M. Carlson R. W.
The Age of Lunar Ferroan Anorthosite 60025 with Implications for the Interpretation of Lunar Chronology and the Magma Ocean Model **[#1171]**
The age of the lunar FAN 60025 has been determined to be 4360 ± 3 Ma using ^{207}Pb–^{206}Pb, ^{147}Sm–^{143}Nd, and ^{146}Sm–^{142}Nd isotopic systems..

11:00 a.m. Nyquist L. E. * Shih C.-Y. Reese Y. D. Park J. Bogard D. D. Garrison D. H. Yamaguchi A.
Sm-Nd and Ar-Ar Studies of Dho 908 and 489: Implications for Lunar Crustal History **[#2368]**
Sm-Nd isotopic systematics are well defined for most lunar FANs, consistent with derivation from the lunar magma ocean. Some anorthosites, including both Apollo samples and meteorite clasts, have anomalous isotopic systematics, suggesting an alternate origin.

11:15 a.m. Elardo S. M. * McCubbin F. M. Shearer C. K. Jr. Draper D. S.
Mechanisms for the Depletion of Chromium in Mg-Suite Parental Magmas **[#2309]**
Cr in olivine from the lunar Mg-suite is much lower than what would be expected if early magma ocean cumulates are the Mg-suite source rocks. We explore mechanisms by which early LMO cumulates or Mg-suite parental magmas could be depleted in Cr.

11:30 a.m. Gross J. * Treiman A. H. Filiberto J.
Constraints on the Geochemical Variations and Evolution of the Lunar Crust and Mantle as Revealed by Fe, Mn and Cr Concentrations in Olivine **[#2805]**
Olivine compositions in lunar meteorite ALHA81005 show a range of Fe/Mn and Cr/Fo ratios, reflecting a complex petrogenetic history. We use these concentration ratios to constrain the formation and oxygen fugacity history of the lunar crust and mantle.