**Tuesday, March 18, 2003**
**POSTER SESSION I**
**7:00 p.m. Fitness Center**

**Moon and Mercury: Early Evolution, Basalts, and Regolith**

Scott R. S. Wilson L.
*The Stress State of a Cooling Magma Ocean* **[#1717]**
We address the early thermal and mechanical evolution of a lunar crust forming from a magma ocean to assess the conditions under which early volcanism may have occurred. Large compressive stresses may have been temporally and spatially common.

Consolmagno G. J.
*The Composition and Evolution of a Geophysically Reasonable Moon Produced by a Giant Impact* **[#1165]**
If the Moon was made of material from the Giant Impact impactor, then its bulk composition will be strongly affected by the previous evolution of that impactor, with interesting geochemical implications.

Yin Q. Z. Jacobsen S. B. Wasserburg G. J.
*Cautionary Notes on Cosmogenic $^{182}W$ and Other Nuclei in Lunar Samples* **[#1510]**
We strike a cautionary note on cosmogenic $^{182}W$ on lunar samples (Lee et al., 2002). There are inconsistencies with other isotope data, such as $^{149}Sm$ isotope obtained from the same sample. There is also potential problem with $^{181}Ta$ overlapping $^{182}W$.

Anand M. Taylor L. A. Nazarov M. A. Patchen A.
*Petrologic Comparisons of Lunar Mare Basalt Meteorites Dh-287A and NWA 032* **[#1787]**
Dh-287A and NWA 032 are two out of only five mare basalt meteorites in the entire lunar meteorite collection. In this study, their petrologic comparisons have been made to understand the magmatic history of the Moon.

Jolliff B. L. Korotev R. L. Zeigler R. A. Floss C. Haskin L. A.
*Northwest Africa 773: Lunar Mare Breccia with a Shallow-formed Olivine-cumulate Component, Very-Low-Ti Heritage, and a KREEP Connection* **[#1935]**
Mineral compositions and a KREEP-like trace element pattern indicate that the olivine-cumulate lithology and breccia components of NWA773 formed in a shallow magma chamber from melt of composition similar to green, VLT volcanic glass from Apollo 14.

Neal C. R. Kramer G. Y.
*The Composition of KREEP: A Detailed Study of KREEP Basalt 15386* **[#2023]**
The purpose of this study was to analyze 15386 by inductively coupled plasma mass spectrometry (ICP-MS) for 40 trace elements, including many not previously quantified in this sample.

Mayne R. G, Taylor L. A.
*New Insights into the Origin of 14053 – The Only Basaltic Rock Returned by Apollo 14* **[#1604]**
Apollo 14 basalts, 14053 and its small-sized pair, 14072, are unique among the rocks in the lunar collection, in that they possess evidence for being the most reduced of all lunar basalts. It is to the origin of these unusual rocks to which this study is addressed.

Kramer G. Y. Neal C. R.
*Petrogenesis of the Apollo 14 High-Al Basalts Revisited: Distinct Magmatic Events, Source Metasomatism, and AFC* **[#2035]**
New ICP-MS data for the Apollo 14 high-Al basalts and literature data are used to revisit the petrogenesis of the oldest returned lunar basalts.

Elkins-Tanton L. T. Chatterjee N. Grove T. L.
*Magmatic Processes that Produced Lunar Fire Fountains: Evidence from Vesicular Rims on Picritic Glass Beads* **[#1486]**
There are small patches of highly vesicular, sulfur-rich green glass adhering to A15 green glasses in slide 15426,72. Their compositional data are consistent with a heterogeneous mantle at depth, or with origination in a primordial source.

Hagerty J. J. Shearer C. K. Vaniman D. T.
*The Behavior of Thorium in Lunar Picritic Magmas: Implications for the Bulk Thorium Content of the Lunar Mantle and Lunar Heat Flow* **[#1784]**
Th concentrations in lunar pyroclastic glasses have been used to represent the Th content of primary melts from the lunar mantle. The data suggest that substantially lower values of Th and U need to be used for global lunar heat flow calculations.

Flor E. L. Jolliff B. L. Gillis J. J.
*Mapping the Concentration of Iron, Titanium, and Thorium in Mare Basalts in the Western Procellarum Region of the Moon* **[#2086]**
Remotely sensed compositions in the western Procellarum region indicate indigenous Th enrichment in basalts. Concentration of radioactive elements in mantle sources beneath Procellarum provide heat needed for extended volcanic activity.

Jackson N. W.
*The Source of Lunar Basalts in the Northern Oceanus Procellarum Region* **[#1010]**
An investigation to infer the flow directions of basalt in northern Oceanus Procellarum. A study of the basalts' stratigraphy and topography of this region to infer the direction of the flow of the basalt into northern Oceanus Procellarum.

Staid M. I. Eliason E. M. Gaddis L. R. Pieters C. M.
*Global Comparisons of Mare Crater Spectra from Clementine UVVIS and NIR Data* **[#1767]**
The reflectance properties of small mare craters are examined using Clementine UVVIS and NIR multispectral data (0.4–2.0 microns). Near and far side mare deposits are compared to investigate the global distribution and diversity of lunar volcanism.

Hiesinger H. Head J. W. III Wolf U. Jaumann R. Neukum G.
*Ages of Lunar Mare Basalts in Mare Frigoris and Other Nearside Maria* **[#1257]**
We performed new crater counts for basalts in Mare Frigoris, Nectaris, Smythii, Marginis, Vaporum, Sinus Medii, Palus Putredinis and the craters Schickard, Grimaldi, Crüger, Hubble, Joliot, Goddard, and two lava ponds south of the crater Endymion.

Demidova S. I. Nazarov M. A. Taylor L. A. Patchen A.
*Dhofar 304, 305, 306 and 307: New Lunar Highland Meteorites from Oman* **[#1285]**
First data of petrology and mineralogy of Dhofar 304, 305, 306 and 307 lunar highland meteorites are reported. Dhofar 304 may be paired with Dhofar 025. Dhofar 302, 303, 305, 306 and 307 are probably paired.

Nazarov M. A. Demidova S. I. Taylor L. A.
*Trace Element Chemistry of Lunar Highland Meteorites from Oman* **[#1636]**
Trace-element chemistry of Dhofar 280, 301-310 lunar highland meteorites is reported. Dhofar 025, 301, 304 and 308 possibly represent a single and most-ancient fall. Dhofar 081 and 280 are not paired with other lunar stones collected nearby.

Korotev R. L. Jolliff B. L. Campbell A. J. Humayun M.
*Laser-Ablation ICP-MS Analyses of Meteoritic Metal Grains in Lunar Impact-Melt Breccias* **[#1487]**
We test the feasibility of using laser-ablation ICP-MS of metal grains in lunar breccias as a means to distinguish among different impact events. Metal grains from KREEP-rich melt breccias of Apollo 16 are all similar in composition, and somewhat different from those of Apollo 17 melt breccias.

Kong M. Bhattacharya R. James C. Basu A.
*Estimating the Average Diameter of a Population of Spheres from Observed Diameters of Random Two-Dimensional Sections* **[#1120]**
Probabilistic deduction predicts $\pi/4$ as the conversion factor to estimate mean 3D diameter of a population of spheres from their 2D sizes in sections, which is supported by numerical solutions to 2D distributions of Fe0 globules in agglutinates.

Pieters C. M. Taylor L. A.
*New Model for Agglutinitic Glass Formation from LSCC Data* **[#1223]**
Combined LSCC data of representative mare and highland soils suggest preferential melting of mineral species is more likely than the F3 model for agglutinate formation. Proposed mineral preference entering the melt is orthopyx > plag > clinopyx » ilmen.

James C. L. Letsinger S. L. Basu A. Wentworth S. J. McKay D. S.
*Nanophase Iron Globules in Lunar Soil* **[#1992]**
Determination of size distribution of nanophase iron globules in lunar soils requires both SEM and TEM imaging.

Kurahashi E. Yamanaka C. Nakamura K. Sasaki S.
*Laboratory Simulation of Space Weathering: ESR Measurements of Nanophase Metallic Iron in Laser-irradiated Olivine and Pyroxene Samples* **[#1499]**
To simulate space weathering, we irradiated nanosecond pulse laser beam onto olivine and pyroxene pellets. After laser irradiation, we measured the samples by an Electron Spin Resonance to perform quantitative analysis of nanophase iron particles.

Wiesli R. A. Beard B. L. Taylor L. A. Welch S. A. Johnson C. M.
*Iron Isotope Composition of the Lunar Mare Regolith: Implications for Isotopic Fractionation During Production of Single Domain Iron Metal* **[#1500]**
Iron-isotope analyses of lunar mare regolith samples indicate an enrichment of the heavy isotopes in the more fine grained, mature soil samples with respect to immature, coarser grained size fractions, possibly due to Fe vaporization during meteorite impacts.

Taylor L. A. Pieters C. Patchen A. Taylor D.-H. Morris R. V. Keller L. P. McKay D. S.
*Mineralogical Characterization of Lunar Highland Soils* **[#1774]**
The modal abundances and chemistry of the minerals and glasses in the finest fractions (<45 micron) of 10 selected Apollo 14 and 16 highland soils have been studied. These data will be used to refine spectral reflectance models and aid in understanding the formation of the highland soils.

Sugihara T. Owada A. Ohtake M. Takeda H.
*MGM Deconvolution of Reflectance Spectrum of the Y981031 Lunar Meteorite* **[#1568]**
We report Modified gaussian model (MGM) deconvolution analyses of reflectance spectrum of the Yamato (Y) 981031. Absorption features derived from the MGM deconvolution are compared with the petrological characteristics of Y981031, and implication of the absorption features are discussed.

Levine J. Karner D. B. Muller R. A. Renne P. R.
*Lunar Impact History from Apollo 12 Glass Spherules* **[#1034]**
We are measuring the impact history of the inner solar system by dating, with the $^{40}Ar/^{39}Ar$ method, glass impact spherules from the Apollo 12 mission to the Procellarum Basin. One interest is in looking for the 400 Ma increase in cratering observed by Culler et al. (2000).

Norman M. D.
*Regional Heterogeneity of KREEP: Impact Melts from Apollo 16 and 17* **[#1180]**
Integrated studies of lithophile element compositions, siderophile element signatures, and chronologies of lunar impact melts can be linked to provide a better understanding of the impact history and crustal evolution of the Moon.

Starukhina L. V. Shkuratov Yu. G.
*Swirl Formation: Cometary Wind or Meteoroid Swarm Encounter?* **[#1227]**
Mechanical and thermal effects of coma gas in cometary encounters with the Moon or Mercury are shown to be negligible as compared to those of comet nucleus explosure. Plowing of regolith by meteoroid swarm is proposed as mechanism of swirl formation.

Starukhina L. V. Shkuratov Yu. G.
*Overmaturation of Lunar and Mercurian Regolith as a Mechanism of Brightening Effect* **[#1224]**
Growth of nanograins of reduced Fe to micron or submicron sizes can occur at Mercury surface temperatures or in large melted volumes on Mercury and the Moon. Such growth can result in brightening of mature regolith ("overmaturation").

Andre S. L. Robinson M. S. Watters T. R. Cook A. C.
*A Comparison of Topography and Shaded Relief of the Beethoven Quadrangle of Mercury* **[#2026]**
We compare topography and shaded relief within the Beethoven quadrangle of Mercury.

Watters T. R. Robinson M. S.
*The Spatial and Azimuthal Distribution of Lobate Scarps and High-Relief Ridges on Mercury* **[#1927]**
An understanding of the spatial and azimuthal distribution of lobate scarps on Mercury is important in constraining models for the origin of tectonic stresses. A comprehensive database of lobate scarps on the hemisphere of Mercury imaged by Mariner 10 is used to test these models.