Tuesday, March 19, 2013 **[T628]**
POSTER SESSION: LUNAR SAMPLES
6:00 p.m. Town Center Exhibit Area

Agee C. B. Korotev R. L. Irving A. J. ***POSTER LOCATION #387***
Petrology and Bulk Composition of Two Lunar Fragmental Breccias: Northwest Africa 7493 and Northwest Africa 7611 **[#2629]**
Two different lunar breccia meteorites recovered in Northwest Africa in 2011 and 2012 add considerably to our knowledge of the Moon.

Korotev R. L. Irving A. J. ***POSTER LOCATION #388***
Keeping Up with the Lunar Meteorites – 2013 **[#1216]**
Twelve new lunar meteorites are described. Four are paired with known meteorites, two are pairs or launch pairs, and six appear to represent new meteorites.

North S. N. Jolliff B. L. Korotev R. L. ***POSTER LOCATION #389***
Pyroxene Composition in Lunar Meteorite NWA 2727 and Comparison to NWA 7007 **[#3013]**
Our objective is to present the composition of a pyroxene-rich ferroan gabbro clast in lunar meteorite NWA 2727 and provide a comparison to NWA 7007.

Fagan T. J. Wakabayashi Y. Suginohara A. Kashima D. ***POSTER LOCATION #390***
Controls and Constraints on Tholeiite-Like and Calc-Alkaline-Like Igneous Trends on the Moon from Northwest Africa 773 and Apollo 15405 **[#1812]**
A tholeiitic magmatic suite is preserved in lunar breccia NWA 773. Apollo 15 QMD is more calc-alkaline. Trends formed by fractionation and immiscibility.

Elardo S. M. Shearer C. K. ***POSTER LOCATION #391***
The Origin of Oscillatory Zoning of Major and Minor Elements in Pyroxene Phenocrysts in Lunar Basaltic Meteorite NWA 032/479 **[#1701]**
Oscillatory zoning of pyroxene in NWA 032/479 provides a record of magma chamber processes and the cooling history of the youngest igneous lunar sample.

Zeigler R. A. Korotev R. L. ***POSTER LOCATION #392***
Petrography and Geochemistry of Feldspathic Lunar Meteorite Larkman Nunatak 06638 **[#1767]**
We report a detailed description of the petrography and geochemistry of LAR 06638, and discuss potential pairing relationships with other lunar meteorites.

Liu J. G. Walker R. J. ***POSTER LOCATION #393***
Multiple Impactors Evidenced in Apollo 16 Lunar Impact-Melt Breccias **[#1837]**
The HSE characteristics show that Apollo 16 lunar impact-melt breccias smaple ejecta of multiple, major impactors that created the surrounding basins.

Fagan A. L. Neal C. R. Beard S. P. Swindle T. D. ***POSTER LOCATION #394***
Bulk Composition and ^{40}Ar-^{39}Ar Age Dating Suggests Impact Melt Sample 67095 may be Exotic to the Apollo 16 Site **[#3075]**
Impact melt 67095 is chemically distinct from average Apollo 16 soil. Ar data suggest a thermal event ~700 Ma or less. It is likely exotic to the site.

Lawrence S. J. Taylor G. J. Norman M. D. ***POSTER LOCATION #395***
Trace Element Geochemistry of Mineral Clasts in Apollo 16 Impact Melt Breccias **[#2848]**
We present new trace-element geochemistry data for mineral clasts in Apollo 16 impact melt breccias.

Roberts S. E. Neal C. R. ***POSTER LOCATION #396***
Petrography is Still Relevant! Examination of Lunar Melt Rocks to Determine Formation and Evolution **[#2570]**
Crystal size distributions of plagioclase and olivine can be used to distinguish pristine melts of the lunar interior from impact melts.

Sharp M. Gerasimenko I. Loudin L. James O. B. Puchtel I. S. et al. ***POSTER LOCATION #397***
Characterizing the Dominant Impactor Signature of Apollo 17 Impact Melt Rocks and Metals **[#1280]**
We report highly-siderophile-element concentrations and $^{187}Os/^{188}Os$ ratios for seven additional Apollo 17 melt rocks and four metal separates from one sample.

Sridhar J. Cooper B. L. Mckay D. S. ***POSTER LOCATION #398***
Extraction of Meteoritic Metals from Lunar Regolith **[#2276]**
This research aims to develop and test ways to magnetically separate meteoritic metals from the lunar soil with different magnetic configurations.

Wittmann A. Korotev R. L. ***POSTER LOCATION #399***
Iron-Nickel(-Cobalt) Metal in Lunar Rocks Revisited **[#3035]**
Occurrences of metal particles with high Ni and Co concentrations in lunar rocks are compared with those in lunar meteorite Shişr 161.

Carpenter P. K. North S. N. Jolliff B. L. Donovan J. J. ***POSTER LOCATION #400***
EPMA Quantitative Compositional Mapping and Analysis of Lunar Samples **[#1827]**
We present the first fully quantitative EPMA WDS stage maps of lunar samples with methods for compositional mapping and processing of analytical data.

Guiza B. G. Day J. M. D. ***POSTER LOCATION #401***
Insights into Volcanism on the Moon from Quantitative Textural Analysis of Mare Basalts **[#1825]**
Quantitative textural analysis informs on crystallization processes during lava flow emplacement on the Moon.

Timms N. E. Reddy S. M. Nemchin A. A. Grange M. L. Pidgeon R. T. et al. ***POSTER LOCATION #402***
Applications of Electron Backscatter Diffraction to Lunar and Other Extraterrestrial Samples **[#1942]**
We discuss the benefits and limitations of electron backscatter diffraction analysis in the resolution of microstructures in lunar and meteorite samples.

Barmatz M. Steinfeld D. Winterhalter D. Rickman D. Weinstein M. ***POSTER LOCATION #403***
Microwave Heating Studies and Instrumentation for Processing Lunar Regolith and Simulants **[#1223]**
We show that in most cases sharper particle lunar simulants microwave heat more efficiently than rounder particle simulants. Enhanced heating was also observed.

Donohue P. H. Neal C. R. ***POSTER LOCATION #404***
Quantitative Petrography of Ilmenite in Lunar Mare Basalts **[#2497]**
Crystal size distributions of groundmass ilmenite quantifies relationships to cooling rates, position within a flow, and residence time.

Donohue P. H. Stevens R. E. Neal C. R. Zeigler R. A. ***POSTER LOCATION #405***
Testing the Origins of Basalt Fragments from Apollo 16 **[#2897]**
Quantitative textural analysis of olivine and plagioclase in basalt fragments 60603,10-16 and 65703,9-13 suggest affinities with an impact origin.

Snape J. F. Alexander L. Crawford I. A. Joy K. H. ***POSTER LOCATION #406***
Basaltic Regolith Sample 12003,314: A New Member of the Apollo 12 Feldspathic Basalt Suite? **[#1044]**
We present results of a petrologic analysis of an Apollo 12 basaltic chip (12003,314) that has been proposed as a new member of the feldspathic basalt suite.

Greenwood J. P. Itoh S. Sakamoto N. Warren P. H. Taylor L. A. et al. ***POSTER LOCATION #407***
The Moon: Getting Wetter all the Time (A Survey of Apatite in Apollo 12 Basalts) **[#2647]**
The evidence for a wet Moon continues with water- and hydrogen-isotope data from apatite in all four suites of Apollo 12 basalts.

Zellner N. E. B. Norman M. D. Jourdan F. ***POSTER LOCATION #408***
Compositions and Ages of Apollo 15 Lunar Impact and Volcanic Glasses: Next Results **[#2539]**
We present the first $^{40}Ar/^{39}Ar$ ages of Apollo 15 impact glasses, improved $^{40}Ar/^{39}Ar$ ages of Apollo 15 volcanic glasses, and the geochemistries of both.

Joy K. H. ***POSTER LOCATION #409***
Trace Elements in Lunar Plagioclase as Indicators of Source Lithology **[#1033]**
Trace elements in lunar plagioclase are diagnostic of provenance. Data are compared and contrasted from Apollo and lunar meteorite samples.

Graff M. A. Sun C. Liang Y. ***POSTER LOCATION #410***
Internally Consistent REE Partitioning Models for Anorthite and Low-Calcium Pyroxene: A Reappraisal of Subsolidus Reequilibration with Applications to Parent Magma Compositions of Lunar Ferroan Anorthosites **[#1641]**
We present new experimental results for REE partioning between anorthite and lunar basaltic melts to reassess compositions of the lunar magma ocean.

Sun C. Liang Y. ***POSTER LOCATION #411***
A REE-in-Plagioclase-Clinopyroxene Thermometer for Mafic and Ultramafic Rocks from the Earth, Moon, and Other Planetary Bodies **[#1627]**
We present a REE-in-plagioclase-clinopyroxene thermometer that can record thermal events close to magmatic temperatures for FANs, Mg-suite rocks, CAIs, and POIs.

Krawczynski M. J. Millet M.-A. Dauphas N. Van Orman J. A. ***POSTER LOCATION #412***
The Mare Basalt Fe-Isotope Dichotomy: A Preliminary Exploration into the role of Ilmenite Fractionation **[#2620]**
We present a preliminary evaluation on the feasibility of ilmenite crystallization causing the bulk Fe-isotope dichotomy between high- and low-Ti mare basalts.

DiFrancesco N. J. Nekvasil H. Ustunisik G. Lindsley D. H. ***POSTER LOCATION #413***
Evolved Melts from Lunar Highlands Basalts: Can they Produce Lunar Granites? **[#2619]**
Fractional crystallization of lunar basalt 14053 with added Cl and F shows evidence of Fe-enrichment and Si-depletion and increasing late liquid density.

Seddio S. M. Wang A. Jolliff B. L. Korotev R. L. ***POSTER LOCATION #414***
Raman Imaging of a Granitic Lunar Breccia **[#2568]**
Laser Raman images! X-ray maps! High-resolution! Apollo 12 granitic breccia! Silica polymorphs! Zoned clinopyroxene! Granophyre! Mg-Fe equilibration! Quartz!

Hui H. Neal C. R. ***POSTER LOCATION #415***
Alternative Interpretations for the Reversed Zoning in Plagioclase of Alkali Anorthosite 14305,303 **[#2880]**
We proposed alternative interpretations for the reversed zoning in plagioclase of alkali anorthosite 14305,303 that involves water in the KREEPy parent magma.

Cronbererger K. Neal C. R. ***POSTER LOCATION #416***
KREEP Basalts: Integrating Quantitative Textural Analysis with Chemical **[#3051]**
Combination of CSDs and in situ chemical analysis of mineral phases allows for a minimally destructive approach to study a dwindling supply of KREEP basalts.

Prissel T. C. Parman S. W. Head J. W. Wilson L. ***POSTER LOCATION #417***
Mg-Suite Plutons: Implications for Mantle-Derived Primitive Magma Source Depths on the Moon **[#3041]**
Geophysical models governing the ascent and emplacement of low-density primitive liquids (Mg-suite parental liquid) suggest shallow mantle source regions.

Piskorz D. Stevenson D. J. ***POSTER LOCATION #418***
Melt Migration in the Early Lunar Crust: Formation of the Primitive, Pure Lunar Ferroan Anorthosites **[#1704]**
We model a magma ocean with a flotation lid and find that escape of melt may occur for reasonable parameters, creating more nearly pure lunar anorthosites.

Sun C. Liang Y. Hess P. C. ***POSTER LOCATION #419***
A Parameterized Thermodynamic Model for Ilmenite Solubility in Silicate Melts **[#2295]**
We present an ilmenite solubility model and reexamine LMO crystallization. The new model has great implications for thermal and chemical evolution of the Moon.

Rask J. C. Zeidler-Erdely P. C. Meighan T. Barger M. W. Wallace W. T. et al. ***POSTER LOCATION #420***
The Chemical Reactivity of Lunar Dust Influences its Biological Effect in the Lungs **[#3062]**
Our results show that the chemical reactivity of Apollo 14 lunar dust influences its biological effect in the lungs of rats.

Tartèse R. Anand M. Delhaye T. ***POSTER LOCATION #421***
NanoSIMS Pb/Pb Dating of Tranquillityite in High-Ti Lunar Basalts: Constraints on Ages and Duration of High-Ti Volcanism on the Moon **[#1274]**
We report new tranquillityite Pb/Pb ages from three high-Ti basalts from Apollo collections, providing new constraints on the ages of high-Ti volcanism on the Moon.

Pidgeon R. T. Grange M. L. Nemchin A. A. ***POSTER LOCATION #422***
1950Ma Annealing of Radiation Damage in a Complex Zircon from an Apollo 15 Breccia **[#1819]**
A complex ~ 4345 Ma zircon from an Apollo 15 breccia has undergone disturbance of its U-Pb system and annealing of its radiation damage at ~1950 Ma.

Kleine T. Burkhardt C. Sprung P. ***POSTER LOCATION #423***
Chondritic Sm/Nd in Terrestrial Planets and the Origin of Nucleosynthetic 142Nd Variations **[#3020]**
Earth, Moon, and Mars have chondritic Sm/Nd and a $^{142}Nd/^{144}Nd$ slightly below that of the accessible silicate Earth. ^{142}Nd variations have nucleosynthetic origin.

Welten K. C. Owens T. L. DePaolo D. J. Nishiizumi K. ***POSTER LOCATION #424***
Regolith Exposure of Lunar Meteorites Based on Neutron Capture Induced Shifts in Samarium Isotopic Composition **[#2933]**
The isotopic composition of Sm in five lunar meteorites shows large shifts due to neutron capture, indicating CRE ages of 700–1200 Myr in the lunar regolith.

Albalat E. Albarède F. ***POSTER LOCATION #425***
Epithermal Neutron Capture by 167Er in Lunar Samples **[#2330]**
Erbium neutron capture anomalies provide a robust dosimeter of epithermal neutron capture in lunar samples due to interaction of cosmic rays with the lunar regolith.

Fu X. H. Zou Y. L. He H. Y. Zheng Y. C. Li C. L. et al. ***POSTER LOCATION #426***
Diffusion Kinetic and Retentivity of Implanted Helium in Minerals **[#1389]**
This abstract introduced ion implantation and helium extraction experiments, aimed to better characterize helium diffusion in different minerals.

Burger P. V. Shearer C. K. Sharp Z. D. McCubbin F. M. Provencio P. et al. ***POSTER LOCATION #427***
Driving Fumarole Activity on the Moon 1. Chlorine Distribution and its Isotope Composition in "Rusty Rock" 66095. Implications for the Petrogenesis of "Rusty Rock," Origin of "Rusty" Alteration, and Volatile Element Behavior on the Moon **[#2812]**
We examine the Cl distribution and isotopic composition in 66095 to gain insights into the petrogenesis of the "rusty rock" and origin of "rusty" alteration.

Provencio P. P. Shearer C. K. Brearley A. J. ***POSTER LOCATION #428***
Driving Fumarole Activity on the Moon 2. Nano-Scale Textural and Chemical Analysis of Alteration in "Rusty Rock" 66095 **[#1664]**
We examine the nanoscale mineralogy and geochemistry of the alteration in 66095 to gain additional insights into the petrogenesis of the "rusty rock."

Tartèse R. Anand M. Barnes J. J. Starkey N. A. Franchi I. A. ***POSTER LOCATION #429***
Distinct Petrogenesis of Low- and High-Ti Mare Basalts Revealed by OH Content and H Isotope Composition of Apatite **[#2222]**
Our new data on the OH content and D/H ratio in apatites from low- and high-Ti Apollo mare basalts indicate involvement of distinct petrogenetic processes.

McCanta M. C. Krawczynski M. J. Grove T. L. Seaman S. J. ***POSTER LOCATION #430***
Hydrogen Speciation in Low fO_2 Lunar Melts **[#2348]**
Experiments were run to determine hydrogen speciation in low fO_2 lunar melts. OH is dominant though molecular H_2O does appear higher than in terrestrial melts.

Togashi S. Kita N. T. Tomiya A. Morishita Y. ***POSTER LOCATION #431***
Estimation of the Composition of Host Magmas from Plagioclase in Lunar Highland Rocks in Analogy with the Terrestrial Adcumulates **[#2280]**
The high Sc lunar plagioclases from FAN are less affected by post-cumulus processes and preserve the low Ti/Ba ratio of the host magma and their source mantle.

Barry P. H. Hilton D. R. Marti K. Taylor L. A. ***POSTER LOCATION #432***
Indigenous Lunar Nitrogen **[#2160]**
We present new N-isotope data for lunar basalts (n = 3) from the Apollo 12 and 17 missions in an order to better quantify the indigenous lunar nitrogen component.

Carmody L. Liu Y. Taylor L. A. ***POSTER LOCATION #433***
The Water Budget of the Moon: Essential Considerations **[#2159]**
We report in situ measurements of endogenous water and how overall abundances differ with the heterogeneous nature of mesostasis within lunar basalts.

Crites S. T. Lucey P. G. ***POSTER LOCATION #434***
Characterization of Lunar Soils Using Microscopic Hyperspectral Imaging **[#2473]**
We are using microscopic hyperspectral imaging to characterize the spectral and mineralogical properties of lunar soil samples at the individual grain level.

Byrne C. J. ***POSTER LOCATION #435***
Evidence for Earth-Accreting Planetesimals Intercepted by the Moon **[#1344]**
The Moon intercepted some of the last of the planetesimals attracted by Earth's gravity. Five such events are identified from topographic and mineral evidence.