Monday, March 7, 2011
SPECIAL SESSION:
PLANETARY MAGMATIC VOLATILES
8:30 a.m. Waterway Ballroom 6

Chairs: **James Greenwood**
Hanna Nekvasil

8:30 a.m. Jones R. H. * McCubbin F. M. Guan Y.
Phosphate Mineralogy and the Role of Fluids in the Zag H Chondrite **[#2435]**
In Zag, apatite is Cl-rich and has very low H_2O abundances. We propose that Zag records interactions between metamorphosed chondrite material and a dry, halogen-rich fluid that may have originated from degassing a partially molten interior.

8:45 a.m. Becker H. * Fischer-Gödde M.
Highly Siderophile Element Abundances in Lunar Impact Rocks and Implications for the Volatile Budget of the Silicate Earth **[#1786]**
The highly volatile element budget of the silicate Earth will be discussed in the context of late accretion and recent data of highly siderophile elements in ancient lunar impact rocks and the terrestrial mantle.

9:00 a.m. Filiberto J. * Treiman A. H. Dasgupta R.
Comparing the Effects of H_2O, F, and Cl on Near-Liquidus Phase Equilibria of a Model High-Fe Basalt: Implications for Volatile Induced Mantle Melting **[#2064]**
We compare experimental results of a high-Fe basalt composition with fluorine, and chlorine added independently to the effect of water on olivine liquidusdepression of basalts.

9:15 a.m. Ardia P. * Withers A. C. Hirschmann M. M.
Methane Solubility Under Reduced Conditions in a Haplobasaltic Liquid **[#1659]**
We document small but significant solubility of methane in magmatic liquids. These solubilities are smaller than some recent experimental measurements, but sufficient such that methane is likely the dominant dissolved carbon-bearing species in reduced magmas.

9:30 a.m. Youxue Zhang *
"Water" in Lunar Basalts: The Role of Molecular Hydrogen (H_2), Especially in the Diffusion of the H Component **[#1957]**
The highly reduced condition in lunar basalts means that molecular H_2 is likely a significant species of the H component, in addition to OH and molecular H_2O. Hence, H_2 diffusion almost certainly plays a major role in transporting the H component.

9:45 a.m. Hirschmann M. M. *
A Magma Ocean Carbon Pump? **[#2321]**
Dense CO_2 early atmospheres may be limited if a carbon pump operates, transporting C from the surface and precipitating it in reduced phase in planetary interiors. Whether this occurs depends on the solubility of CO_2 and CH_4 as a function of fO_2 and pressure.

10:00 a.m. Weber A. * Saal A. E. Hauri E. H. Rutherford M. J. Van Orman J.
The Volatile Content and D/H Ratios of the Lunar Picritic Glasses **[#2571]**
We present volatile contents (C, H_2O, F, S, Cl) and δD lunar volcanic glasses. Our results suggest the presence of water in the Moon interior with a δD similar to that of the terrestrial mantle.

10:15 a.m. Greenwood J. P. * Itoh S. Sakamoto N. Warren P. H. Dyar M. D. Yurimoto H.
Origin of Lunar Water and Evidence for a Wet Moon from D/H and Water in Lunar Apatites **[#2753]**
We present new results on the D/H and water content of lunar apatites in support of a wet Moon and an elevated D/H.

10:30 a.m. McCubbin F. M. * Shearer C. K. Sharp Z. D.
Magmatic Volatiles in Lunar Apatite: Approaching a Single Solution to Many Unique Observations **[#2341]**
Recent analyses of volatiles from lunar minerals have resulted in seemingly incompatible conclusions regarding the volatile content of the Moon. We attempt to reconcile these differences, placing the data in the context of the lunar magma ocean hypothesis.

10:45 a.m. Shearer C. K. * Burger P. V. Guan Y. Papike J. J. Sutton S. R.
Vapor Element Transport in the Lunar Crust. Open System Transport of Elements in the Shallow Lunar Crust by Anhydrous, Isotopically Light S-Rich Vapor **[#1141]**
Using a variety of approaches, we examine the process of volatile element transport in the lunar crust.

11:00 a.m. Barrat J. A. * Yamaguchi A. Bunch T. E. Bohn M. Bollinger C. Ceuleneer G.
Fluid-Rock Interactions Recorded in Unequilibrated Eucrites **[#1306]**
Some unequilibrated eucrites display olivine veinlets and secondary anorthite that require the involvement of a late metasomatic agent. Aqueous fluids are plausible candidates for explaining the deposits of the secondary phases inside the cracks.

11:15 a.m. Nakamura N. * Nyquist L. E. Reese Y. Shih C-Y. Fujitani T. Okano O.
Stable Chlorine Isotopes and Elemental Chlorine by Thermal Ionization, Mass Spectrometry, and Ion Chromatography; Martian Meteorites, Carbonaceous Chondrites and Standard Rocks **[#2513]**
Results of stable Cl isotope and elemental analyses by TIMS combined with HF-leaching/ion chromatography for martian meteorites, carbonaceous chondrites, and standard rocks are presented.

11:30 a.m. Sharp Z. D. * Shearer C. K. Jr. Agee C. B. McKeegan K. D.
The Chlorine Isotope Composition of Mars **[#2534]**
The chlorine-isotope value of martian meteorites average –0.5‰, indistinguishable from bulk Earth and carbonaceous chondrites. Apatite analyses are variable, from –3.2 to +1.4‰ and correlate with Cl content.