

**Friday, March 5, 2010**  
**MARTIAN IGNEOUS PROCESSES**  
**8:30 a.m. Waterway Ballroom 5**

**Chairs: Christopher Herd**  
**Marieke Schmidt**

- 8:30 a.m. Lapen T. J. \* Brandon A. D. Righter M. Shafer J. Irving A. J.  
[\*A Hybridized Martian Mantle Source for Shergottites\*](#) [#2448]  
 Here we show Lu-Hf and Sm-Nd isotopic evidence for a hybridized upper-mantle source of shergottites as well as ALH 84001.
- 8:45 a.m. Peslier A. H. \* Hnatyshin D. Herd C. D. K. Walton E. L. Brandon A. D. Lapen T. J. Shafer J.  
[\*A More Reduced Mantle Source for Enriched Shergottites; Insights from Olivine-Phyric Shergottite LAR 06319\*](#) [#1503]  
 LAR 06319 detailed oxybarometry shows that a basaltic melt becomes more oxidized during differentiation. The first crystallized assemblages are used to redefine the oxygen fugacity of the enriched shergottite mantle source to the value of FMQ-2.
- 9:00 a.m. Hutchins K. I. \* Agee C. B. Draper D. S.  
[\*High Pressure Experiments Yield Insight into an Early Magma Ocean on Mars\*](#) [#1525]  
*Borg and Draper* (2003) modeled crystallization of the martian mantle from an early, global magma ocean. We are in the process of experimentally testing this model and present our results thus far.
- 9:15 a.m. Schmidt M. E. \* McCoy T. J.  
[\*Heterogeneities in the Martian Mantle Through Time: Clues from Meteorites and Gusev Basalts\*](#) [#1336]  
 The composition of martian basalts reflect their mantle source at the time of extraction. Geochemical data combined with age information are used to interpret how the martian mantle has evolved with time.
- 9:30 a.m. Filiberto J. \* Dasgupta R. Kiefer W. S. Treiman A. H.  
[\*High Pressure Phase Equilibrium Investigation of the Home Plate Pyroclastic Basalt Fastball and Application to Melting in the Martian Mantle\*](#) [#1238]  
 We have investigated the phase equilibria of a Home Plate pyroclastic basalt and show that it represents a primary mantle-derived magma, estimate the plausible mantle melt fraction, and constrain the potential temperature of the martian mantle.
- 9:45 a.m. Gross J. \* Treiman A. H. Filiberto J. Robinson K. L.  
[\*Primitive Olivine-Phyric Shergottite NWA 5789: Petrography, Mineral Chemistry and Cooling History Imply a Magma Similar to Yamato 980459\*](#) [#1813]  
 Petrography, mineral chemistry and cooling history of NWA 5789 and comparison to Yamato 980459 imply that both meteorites are primitive and crystallized from the same type of magma. Primitive melts help elucidate the geology and geochemistry of Mars.
- 10:00 a.m. Shafer J. T. \* Brandon A. D. Lapen T. J. Righter M. Peslier A. H.  
[\*Sm-Nd Age and REE Systematics of Larkman Nunatak 06319: Closed System Fractional Crystallization of a Shergottite Magma\*](#) [#1726]  
 The Sm/Nd age of LAR 06319 is  $180 \pm 13$  Ma. It is a member of the enriched shergottite group. REE contents of pyroxene are consistent with fractional crystallization of a single magma and not with assimilation of a crustal component into a depleted magma.

- 10:15 a.m. Riches A. J. V. \* Liu Y. Day J. M. D. Puchtel I. S. Rumble D. III McSween H. Y. Jr Walker R. J. Taylor L. A.  
[Highly-Siderophile Element Abundances and Re-Os Isotopic Systematics of Lherzolitic Shergottite Yamato 984028](#) [#2618]  
We report HSE abundances and Re-Os isotopic compositions of a newly recognized lherzolitic-shergottite, Yamato 984028, and explore the petrogenetic constraints determined by these elements.
- 10:30 a.m. Goodrich C. A. \* Treiman A. H. Filiberto J. Jercinovic M. J.  
[The Nakhla Parent Magma: Old Problems, New Approaches](#) [#1387]  
We reevaluate evidence that melt trapped in early olivine in Nakhla had very high K and K/Na ratio.
- 10:45 a.m. Jambon A. Barrat J. A. Bollinger C. Sautter V. \* Boudouma O. Greenwood R. C. Franchi I. A. Badia D.  
[Northwest Africa 5790. Top Sequence of the Nakhlite Pile](#) [#1696]  
NWA 5790 is a recently discovered nakhlite. Its mineralogy, petrology and geochemistry suggest that it is the topmost sequence of the nakhlite lava pile.
- 11:00 a.m. Williams C. D. \* Wadhwa M. Bell D. R. Hervig R.  
[Light Lithophile Element Microdistributions in Pyroxenes of the Martian Meteorites](#) [#2641]  
We report here Li, B and Be distributions in pyroxenes of three shergottites (Shergotty and Zagami, and SaU 005) and the nakhlite Yamato 000593 to assess the role of magmatic degassing, igneous fractionation and subsolidus diffusion processes in their petrogenesis.
- 11:15 a.m. Channon M. B. \* Stolper E. M. Eiler J. M.  
[Oxygen Isotope Compositions of Mineral Separates from SNC Meteorites: Constraints on SNC Parental Magmas](#) [#2212]  
We present measurements of  $\delta^{18}\text{O}$  and  $\Delta^{17}\text{O}$  in mineral separates from SNC meteorites; these data define oxygen isotope compositions of their parent magmas and constrain abundances of aqueously altered crustal materials in their sources.
- 11:30 a.m. Herd C. D. K. \* Stern R. A. Walton E. L. Li J. Bibby C.  
[TEM and SEM-CL Analysis of Baddeleyite in NWA 3171: Geochronological Implications for Martian Meteorites](#) [#2280]  
Using a FIB plan-view liftout method for TEM sample preparation, and TEM and SEM-CL analysis of baddeleyite in the NWA 3171 shergottite, we provide insights into baddeleyite petrogenesis and implications for U-Pb geochronology of martian meteorites.