

Friday, March 11, 2011
FROM MANTLE TO CRUST: MARTIAN PETROLOGY AND GEOCHEMISTRY
1:30 p.m. Waterway Ballroom 1

Chairs: John Skok
 Mariek Schmidt

- 1:30 p.m. Shih C.-Y. * Nyquist L. E. Reese Y. Irving A. J.
[Rb-Sr and Sm-Nd Ages, and Petrogenesis of Depleted Shergottite Northwest Africa 5990](#) [#1846]
 A Sm-Nd isochron for NWA 5990 yields $T = 402 \pm 22$ Ma and $\epsilon_{Nd} = +42 \pm 1$. Model calculations suggest depleted shergottites were melts from highly LREE-depleted sources after prior extractions of nakhlite-like magmas from nakhlite-like sources ~1 Ga ago.
- 1:45 p.m. Usui T. * Shearer C. K. Righter K. Jones J. H.
[Effect of Sulfur on Siderophile Element Partitioning Between Olivine and Martian Primary Melt](#) [#1670]
 Although S dissolved in silicate melts has a barely discernible effect on siderophile element partitioning, it is not enough to explain incompatible signatures of Ni and Co in shergottite olivines even in high-S (>3000 ppm) conditions.
- 2:00 p.m. Balta J. B. * McSween H. Y.
[Are Megacrysts in Olivine-Phyric Shergottites Xenocrysts, Phenocrysts, or Something Else?](#) [#1033]
 We argue based on detailed analyses and modeling of shergottite LAR 06319 that its olivines are antecrysts, formed from a melt similar to the current groundmass and entrained from a cumulate pile prior to eruption.
- 2:15 p.m. Ody A. * Poulet F. Langevin Y. Bibring J.-P. Gondet B. Carter J. Vincendon M.
[Global Distribution of Igneous Minerals on Mars: Assessing the Composition of the Crust](#) [#2459]
 The work presented here provides a global and final dataset of surface mineralogy of the mafic minerals (olivines, pyroxene), as revealed by the OMEGA instrument, in order to study their implication in crust formation and evolution.
- 2:30 p.m. Mikouchi T. * Kasama T. Kurihara T.
[More on Nano-Particles in Olivine from the Northwest Africa 1950 Shergottite](#) [#1689]
 We analyzed olivine in NWA 1950 shergottite by an advanced TEM (FEI Titan 80–300) and found abundant nano-particles (1–20 nm). They are primarily Fe metal with minor hematite. The Fe metal formed by shock and probably altered to hematite by FIB.
- 2:45 p.m. Skok J. R. * Mustard J. F. Tornabene L. L.
[Spectroscopic and Morphological Analysis of Alga Crater's Central Peak: Implications for Mars Primary Crust Formation](#) [#1959]
 A morphological and compositional analysis of the central peak of Alga Crater to examine an excavated section of the unaltered igneous Noachian crust of Mars.
- 3:00 p.m. Edwards C. S. * Christensen P. R.
[Evidence for a Widespread Olivine-Rich Layer on Mars: Identification of a Global Impact Ejecta Deposit?](#) [#2560]
 A relatively thin, global or semi-global, rocky, olivine-rich layer has been identified. We propose that the most likely scenario for the formation of a layer with these characteristics and extent is directly related to a mega-impact event.

- 3:15 p.m. Crumpler L. * Athena Science Team
[Summary of Regional Martian Geologic History from In Situ Stratigraphic Measurements in the Columbia Hills, Gusev Crater, MER Spirit Rover](#) [#2531]
Correlation of stratigraphic sections measured along the Columbia Hills transect by Spirit identifies secular trends that reflect regional and global changes in the geologic environments on Mars over time.
- 3:30 p.m. Schmidt M. E. * Schrader C. M. McCoy T. J.
[How Oxidized are the Gusev Basalts?](#) [#2277]
Magmatic oxygen fugacities are estimated for the Gusev basalts and found to be similar to those found in the shergottitic meteorites.
- 3:45 p.m. Shearer C. K. * Burger P. V. Sutton S. R. Papike J. J. McCubbin F.
[REE Crystal Chemistry of Phosphates in Extraterrestrial Basalts at Different Oxygen Fugacities. Direct Determination of Europium Valence State in Merrillite-Whitlockite](#) [#1143]
Direct measurement of Eu^{2+} and Eu^{3+} in merrillite illustrate the relationships between oxygen fugacity and merrillite REE crystal chemistry in martian and lunar basalts.
- 4:00 p.m. Hicks L. J. * Bridges J. C. Gurman S. J. Changela H. G.
[Oxidation of the Nakhlite Martian Meteorites During an Impact Hydrothermal Event](#) [#1790]
To constrain the oxidation state of hydrothermal fluids on Mars, Fe k XANES has been performed on nine nakhlites. Pre-absorption edge features reveal an increase in $\text{Fe}^{3+}/\text{Fe}^{2+}$ within alteration veins compared to surrounding minerals.
- 4:15 p.m. McSween H. Y. * Hahn B. C. Viviano C. E. Moersch J.
[Onset of Metamorphism in the Martian Crust](#) [#1064]
Metamorphic mineral assemblages provide important constraints on geothermal gradients, protoliths, and phases not yet identified by remote sensing.
- 4:30 p.m. Hamilton V. E. * Rogers A. D.
[A New View of Martian Surface Geochemistry](#) [#1273]
We present new global weight percent oxide maps of Mars calculated from TES mineralogy, compare our values to previous work, and show consistency with martian weathering trends. Our data reveal statistically distinguishable regional variations in chemistry.