Thursday, March 22, 2012
POSTER SESSION II: LOW-TEMPERATURE AQUEOUS MARTIAN GEOCHEMISTRY
6:00 p.m. Town Center Exhibit Area

Pritchett B. P. Elwood Madden M. E. Madden A. S.
Salinity and Temperature Effects on the Dissolution of Natrojarosite and K-Jarosite **[#2331]**
This study examines the effects of activity of water on the dissolution rates and the lifetimes of Na- and K-jarosite. It found that jarosite dissolution rates and particle lifetimes are extended in high salinity brines compared to dilute fluids.

Zahrai S. K. Elwood Madden M. E. Madden A. S. Rimstidt J. D.
Comparing Na-Jarosite and K-Jarosite Dissolution Rates to Determine the Effects of Crystal Chemistry on Jarosite Lifetimes **[#1658]**
In this study, Na-jarosite dissolution experiments were conducted and compared to previous K-jarosite results. By comparing these two phases, the effect of crystal chemistry on jarosite dissolution rates can be determined.

Madden A. S. Elwood Madden M. E. Rimstidt J. D. Kendall M. R.
Time-Course Mineralogy and Texture of Nanoscale Jarosite Dissolution Products **[#1684]**
Investigation of jarosite dissolution reaction products with AFM, SEM, TEM, and XRD demonstrated patterns indicative of reaction progress and solution conditions.

Sansano A. Sobron P. Sanz J. A.
Evaporation Pathways and Solubility of Fe-Ca-Mg-Rich Salts in Acid Sulfate Waters. A Model for Martian Ancient Surface Waters **[#2862]**
In this work we have characterized a layered deposit formed from the evaporation of stream water from Rio Tinto, Spain, a relevant Mars analog site. The minerals detected in-situ, confirmed later via high resolution Raman spectroscopy.

Sansano A. Medina J. Rull F.
Identification of Iron Sulfates by Raman Spectroscopy. Outcomes on the Missions to Mars **[#2784]**
Identification of iron sulfates by Raman spectroscopy using synthetic sulfates and sulfates from analogs. The results obtained with this technique on the Exomars mission could give us new data about the sequence of formation of the sulfate system on the brines of Mars and their possible implication in the habitability of that environment.

Rao M. N. Nyquist L. E. Ross D. K. Asimow P. D. See T. Sutton S. Cardenas F. Montes R. Cintala M.
Laboratory Shock Experiments on Basalt — Iron Sulfate Mixes at ~40–50 GPa and Their Relevance to the Martian Regolith Component Present in Shergottites **[#2102]**
By conducting laboratory shock experiments, we demonstrate the plausibility of iron sulfate reduction to sulfides in martian meteorites by shock.

Fortes A. D. Browning F. Wood I. G.
Ionic Substitution in Meridianiite ($MgSO_4$•$11H_2O$): Solid Solutions and Novel Hydrates **[#1024]**
We report on an extensive study of chemical substitution in magnesium sulfate undecahydrate (meridianiite); our results may have application to the chemistry and hydration state of sulfates on Mars.

Dehouck E. Chevrier V. F. Gaudin A. Mangold N. Mathé P.-E. Rochette P.
Experimental Weathering of Silicates and Sulfides in CO_2 Atmospheres: Implications for Sulfates Versus Carbonates on Mars **[#2621]**
We present the results of a 4-year-long experiment in which silicates and silicate/sulfide mixtures were weathered under CO_2 atmospheres, and the implications of these results about the formation of carbonates and sulfates at the martian surface.

Weber I. Böttger U. Jessberger E. K. Hübers H. W. Pavlov S. G. Schröder S. Tarcea N. Dörfer Th.
Raman Spectroscopy of Mars Relevant Minerals for Planetary Exploration **[#1793]**
Different natural minerals are investigated by Raman under various temperature, pressure, and atmosphere conditions. Most of the minerals show at least one temperature dependent shift in the spectra.

Sutter B. Ming D. W. Niles P. B. Golden D. C.
The Geochemical Alteration History of Clovis Class Rocks in Gusev Crater as Determined by Ti-Normailized Mass Balance Analysis **[#1518]**
Clovis rocks were exposed to high aqueous activity that resulted in the loss of 20–65% of pyroxene and feldspar, which was followed by periods of lower aqueous activity that allowed for Mg, Si, Ca, S, and Cl additions.

Viviano C. E. Moersch J. E. McSween H. Y.
Spectral Evidence for the Carbonation of Serpentine in Nili Fossae, Mars **[#2682]**
Spectral analysis of Nili Fossae phyllosilicates reveals evidence for the presence of talc (not saponite) and mixed-layer clay. These findings provide further evidence that carbonation of serpentine is the formation mechanism for carbonates on Mars.

Hicks L. J. Bridges J. C. Gurman S. J.
Ferric Iron Content of Nakhlite Hydrothermal Minerals **[#2253]**
Fe-K XANES absorption edge positions are correlated with ferric-ferrous ratios. This allows us to determine the oxidation state of the phyllosilicate (mixed ferric and ferrous) and amorphous gel (ferric) in the Lafayette nakhlite.

Gainey S. R. Hausrath E. M. Hurowitz J. A.
Kinetics of Nontronite Dissolution and Implications for Mars **[#2383]**
The clay mineral nontronite, which forms in liquid water, has been detected on Mars. Our dissolution rates of notronite were slow relative to basalt. Nonstoichiometric dissolution preferentially removed Al relative to the parent material.

Golden D. C. Ming D. W. Hausrath E. M. Morris R. V. Niles P. B. Achilles C. N. Ross D. K. Cooper B. L. Gonzalez C. P. Mertzman S. A.
Dissolution of Olivine, Siderite, and Basalt at 80°C in 0.1M H_2SO_4 in a Flow Through Process: Insights into Acidic Weathering on Mars **[#2521]**
The object of this research is to determine acidic dissolution rates of olivine, siderite, and basaltic materials at 80°C using a flow-thru reactor and to characterize the weathering products.

Crouse C. B. Bish D. L.
Acid-Sulfate Alteration of Montmorillonite and Nontronite Under Mars-Relevant Conditions **[#2283]**
Exposure of montmorillonite and nontronite to low-pH Fe- and Mg-sulfate solutions produced material resembling opal-CT in only the lowest pH experiments and only for nontronite. Montmorillonite is comparatively much more stable in these solutions.

Tu V. Hausrath E. M.
Dissolution Rates of Amorphous Al- and Fe-Phosphates and Their Relevance to Mars **[#2609]**
Phosphorous is crucial for life on Earth and if life has ever existed on Mars it may also have required phosphorous. Measuring dissolution rates of amorphous Al- and Fe-phosphates likely constrains the bioavailability of P for life in martian soils.

Adcock C. T. Hausrath E. M.
The Dissolution Rate of Whitlockite and Implications for the Habitability of Early Mars **[#2446]**
Phosphate is an essential element for life. The dissolution rate of whitlockite indicates that phosphate minerals common to Mars may dissolve faster than common terrestrial phosphates. This has implications for the habitability of the planet.

Zhao Y. S. McLennan S. M.
Experimental Constraints on Partitioning Behavior of the Halogen Elements During Sedimentary Processes on Mars: A Progress Report **[#1958]**
We make a progress report on our experimental investigation of possible controls on Cl and Br partitioning behaviors during sedimentary processes on Mars, including evaporative, diagenetic, and photochemical processes relevant to martian conditions.

Clark A. S. Cull S. C.
Mapping the Distribution of Perchlorates on the Martian Surface at the Phoenix Landing Site **[#2171]**
Mapping the distribution of perchlorates near the Phoenix landing site is accomplished using the Phoenix's Surface Stereo Imager (SSI). Images were chosen for analysis based on the trenching activity of the Phoenix's Robotic Arm.