

Thursday, March 13, 2008
POSTER SESSION II: MARS SEDIMENTARY MINERALOGY
6:30 p.m. Fitness Center

Wang A. Bell J. F. III Rice M. S. Cloutis E. A.

Coexistence of Si-rich and S-rich Materials at Gusev Crater, Columbia Hills [#2186]

Si-rich species encountered by Spirit rover in the vicinity of S-rich soils show a characteristic feature in NIR spectra extracted from multicolor Pancam images. This feature is used to evaluate other potential Si-rich species at Gusev landing site.

Ruff S. W. Farmer J. D. Arvidson R. E. Squyres S. W. Christensen P. R. Athena Science Team

The Nature and Distribution of Silica at Home Plate in Gusev Crater, Mars: Evidence for a Hydrothermal System [#2213]

The silica-rich deposits discovered by the Spirit rover in Gusev Crater are consistent with opaline silica produced in a hydrothermal system.

Morris R. V. Ming D. W. Gellert R. Yen A. S. Clark B. C. Graff T. G. Arvidson R. E. Squyres S. W. Athena and CRISM Science Teams

The Hydrothermal System at Home Plate in Gusev Crater, Mars: Formation of High Silica Material by Acid-Sulfate Alteration of Basalt [#2208]

The high silica material (>90% SiO₂) at Home Plate in Gusev Crater might be a product of acid sulfate alteration under hydrothermal conditions.

Stopar J. D. Taylor G. J.

Aqueous Alteration of Martian Rocks, Clods, Soils, and Meteorites: Trends in Major and Minor Elements [#1514]

Comparing element correlations over different scales (regional to mineral) from a variety of different sources (MERS, Viking, Pathfinder, and martian meteorites) in order to better understand general weathering trends and aqueous conditions on Mars.

Schröder C. Arvidson R. E. Schmidt M. E. Gellert R. Klingelhöfer G. Ming D. W. Morris R. V. Rice J. W. Yen A. S. de Souza P. A. Jr.

Pervasively Altered Hematite-rich Deposits Southeast of Home Plate, Gusev Crater, Mars [#2444]

Hematite-rich, pervasively altered materials have been investigated southeast of Home Plate. Geochemical signatures suggest vertical changes in redox conditions. Hematite-rich platy outcrops may underlie Si-rich material.

Gellert R. Campbell J. L. O'Meara J.

Quantitative Determination of Water Content of In Situ Samples at Gusev Crater Using a New X-Ray Scatter Peak Investigation of APXS Spectra [#2319]

Using a new analysis method for the APXS spectra, we find up to 18 wt.% water in the PasoRobles type soils at Gusev Crater, which contain high amounts of ferric sulfates. This constrains the ferric sulfates to the upper boundary of known hydration levels.

Altheide T. S. Chevrier V. F. Denson J.

Evaporation Kinetics of Liquid Magnesium Sulfate Brines Under Simulated Martian Surface Pressure [#2493]

Here we present evaporation kinetic data on the stability liquid magnesium sulfate brines under martian surface pressures.

Newsom H. E. Shearer C. K. Lanza N. L. Ollila A. M. Nelson M. J. Bullock M. A. Moore J. M. Spilde M. N.

The Effects of Subtle Crystal Chemical Mineral Characteristics on Dissolution Processes; New Experiments on Minerals Reacted in Mars Aqueous Laboratory Simulations [#1469]

Long duration experiments show that minerals exposed to fluids up to one year under martian conditions can exhibit differences in dissolution rate and morphology due to subtle differences in mineral crystal chemistry, such as zoning in apatite.

Hausrath E. M. Golden D. C. Morris R. V. Ming D. W.

Acid Vapor Weathering of Apatite and Implications for Mars [#2350]

Acid vapor experiments containing apatite, olivine, glass, and a mixture of these phases suggest that secondary phosphates brushite, strengite and others may have formed. Similar reactions may have formed similar minerals in Paso Robles.

Basciano L. C. Peterson R. C.

Crystal Chemistry of Natrojarosite, Jarosite and Hydronium Jarosite Solid Solution Series. Implications for CHEMIN Data Analysis [#1908]

Jarosite group minerals can be discriminated using their unit cell dimensions determined by powder diffraction experiments. This data may allow identification of minerals based on observations made by the CHEMIN instrument on the MSL.

Fleischer I. Klingelhöfer G. Morris R. V. Schröder C. Rodionov D. de Souza P. A. Jr.

Analysis of 6.4 keV Mössbauer Spectra Obtained with MIMOS II on MER on Cobbles at Meridiani Planum, Mars and Considerations on Penetration Depths [#1618]

We present depth-selective Mössbauer spectra obtained on Meridiani cobbles, and calculated penetration depths of Mössbauer radiation in comparison with laboratory measurements on layered samples.

Xu W. Tosca N. J. McLennan S. M. Parise J. B.

Relative Humidity-induced Production of Ferricopiapite and Rhomboclase from Ferric Sulfate Anhydrate: X-Ray Diffraction Studies Under Controlled Conditions [#1607]

Hydration of anhydrous ferric sulfate results in complex phase transitions, including ferricopiapite and rhomboclase which are stable under very acid conditions. The process may have been important in generating acidity at the martian surface.

Rao M. N. Nyquist L. E. Sutton S. R. Garrison D. H.

Mobile Element Studies in Rocks (RAT) from Columbia Hills/West Spur at Gusev [#1768]

The hyperbola-straight line method (tested for Meridiani rocks) applied to Columbia Hills/West Spur rocks shows that these rocks were exposed systematically to an evaporating aqueous fluid.

Beavon L. J. McLennan S. M. Tosca N. J. Lindsley D. H.

Experimental Constraints on Trace Element Mobility in Martian Basalt [#1369]

We present a series of low pH aqueous alteration experiments on synthesized martian basalt in an attempt to better understand the mobility of Ni, Zn, and Cr on the martian surface.

Hahn B. C. McLennan S. M. Tosca N. J. Reeder R. J.

Experimental Constraints on Trace Element Behavior in Martian Evaporite Minerals [#1845]

We perform a series of laboratory experiments determining the partitioning coefficients of the trace elements Ni, Zn and Cr into evaporite mineral assemblages similar to those observed at Meridiani Planum, Mars.

Vaniman D. T. Bish D. L. Chipera S. J.

Calcium Sulfate Hydration, Stability and Transformation on Mars [#1816]

Forms of calcium sulfate on Mars are likely to include gypsum, bassanite, and anhydrite. Bassanite may be abundant if alteration of primary calcium carbonate by sulfuric acid was prevalent.

Harrison T. N. Gilmore M. S. Greenwood J. P.

Experimental VNIR Reflectance Spectroscopy of Gypsum Dehydration: Constraints on Sulfate Composition at Iani Chaos, Mars [#1879]

We determine whether gypsum and bassanite can be distinguished in the OMEGA data in order to identify the sulfate mineral detected in Iani Chaos.

Brown A. J. Bish D. L. Bishop J. L.

Dehydration of Ferrous Sulfates Monitored by XRD — Implications for CHEMIN [#1008]

We have studied the stability of a number of ferrous sulfates and carried out XRD measurements to track their stability in a controlled environment. We report on the stability of and breakdown products of melanterite, rozenite, szomolnokite, halotrichite, and romerite.

Podratz L. A. Bish D. L. Schieber J.

Magnesium Sulfate Phase Equilibria in Simulated Martian Conditions [#1887]

We are evaluating the epsomite-hexahydrite reaction using XRD and ESEM. This reaction etches crystal surfaces. This information could yield information about the behavior of magnesium sulfates and changing water history on the surface of Mars.

Bryson K. L. Chevrier V. F. Kennington D. Sears D. W. G.

Adsorption Kinetics in Martian Regolith Analogs [#2123]

To understand the role of regolith adsorption as a source for diurnal variations in atmospheric water on Mars, we have experimentally investigated the adsorption kinetics of martian regolith analogs, montmorillonite, and basalt under martian conditions.

Chevrier V. F. Gavin P. Goetz W. Grauby O. Madsen M. B. Mathe P. E. Rochette P.

Thermally Treated Nontronite as a Model for a Component in the Magnetic Red Dust on the Surface of Mars [#2250]

Magnetic and Mössbauer studies of heated nontronite show formation of various magnetic phases, including non-stoichiometric hematite and spinel. Impacted nontronite deposits could thus provide a source for the nanophase red magnetic dust on Mars.

O'Connor V. Lepper K.

Optical Dating Properties of Calcium and Magnesium Sulfates: Important Components of Mars Surface Sediments [#2089]

Because of their occurrence in martian surface sediments, the optical dating properties of various Ca- and Mg-sulfate minerals were examined as potential geochronometers for geomorphic features and processes on Mars.

Detschel M. J. Lepper K.

The Role of Ultraviolet Light as an Ionizing Radiation Source in the Development of In-Situ Optical Dating Techniques for Mars [#2057]

Ultraviolet (UV) radiation as low as 200 nm or less reaches the surface of Mars, which has an impact on optical dating properties of sediments. This study examines the impact of short wavelength UV on several analogue materials.