

Thursday, March 18, 2004

POSTER SESSION II: WEIRD MARTIAN MINERALS: COMPLEX MARS SURFACE PROCESSES
7:00 p.m. Fitness Center

Hurowitz J. A. Tosca N. J. McLennan S. M. Lindsley D. H. Schoonen M. A. A.
A Reappraisal of Adsorbed Superoxide Ion as the Cause Behind the Reactivity of the Martian Soils [#1699]
New experimental evidence indicates that under typical Martian surface conditions, adsorbed superoxide does not provide a viable explanation for the oxygen release from the Martian soils detected during the Viking Gas Exchange experiments.

Fialips C. I. Carey J. W. Vaniman D. T. Feldman W. C. Bish D. L. Mellon M. T.
Sub-Surface Deposits of Hydrous Silicates or Hydrated Magnesium Sulfates as Hydrogen Reservoirs near the Martian Equator: Plausible or Not? [#2054]
Yearly mean temperatures and water vapor pressures at the martian surface were used to identify and map abundances of hydrous clays, zeolites, or Mg-sulfates that would be needed to account for the water observed by the Odyssey neutron spectrometer.

Lauer H. V. Jr. Ming D. W. Golden D. C. Morris R. V.
Thermal and Evolved Gas Analysis of Smectites: The Search for Water on Mars [#1909]
The TA/EGA behaviors of Mars analog materials provide needed characterization of volatile phase that might be encountered on Mars during robotic missions.

Stopar J. D. Taylor G. J. Boynton W.
Aqueous Alteration Pathways for K, Th, and U on Mars [#1429]
We used dissolution rate and residence time calculations of component minerals in Shergotty to determine the K/Th/U ratios as a martian basalt is dissolved in water. Some variation in K/Th/U ratios may be due to aqueous alteration processes.

Schaefer M. W. Dyar M. D. Rothstein Y. Hanify K. M. Griswold J. L.
Temperature Dependence of the Mössbauer Fraction in Mars-Analog Minerals [#1768]
The temperature dependence of the Mössbauer fraction of likely Mars minerals is necessary data to the interpretation of remote Mössbauer spectra from the MER landers. We present results from an ongoing study to produce a database of Mössbauer parameters for use in the analyses of these spectra.

Golden D. C. Ming D. W. Morris R. V.
Acid-Sulfate Vapor Reactions with Basaltic Tephra: An Analog for Martian Surface Processes [#1388]
Formation of putative martian minerals by exposure of polished thin sections of basaltic tephra to sulfuric acid vapor at 150°C was studied. The process of acid vapor interaction with basalts is a potential analog for a Martian process.

Arlauckas S. M. Hurowitz J. A. Tosca N. J. McLennan S. M.
Iron Oxide Weathering in Sulfuric Acid: Implications for Mars [#1868]
Aqueous sulfuric acid may have dissolved iron oxides in Martian basalt. Magnetite dissolves at 25°C in sulfuric acid. As pH decreases, the rate of dissolution increases. Aqueous Fe may have precipitated as secondary Fe-bearing minerals on Mars.

Greenwood J. P. Blake R. E. Barrón V. Torrent J.
P/Fe as an Aquamarker for Mars [#1839]
P/Fe is developed as a chemical indicator for aqueous activity by MER APXS.

Socki R. A. Gibson E. K. Jr. Perry E. C. Jr. Galindo C. Golden D. C. Ming D. W. McKay G. A.
*Stable Isotope Composition of Carbonates Formed in Low-Temperature Terrestrial Environments as
Martian Analogs* [#1841]

We report the C and O isotope composition of carbonate minerals that formed in two low-temperature environments. Results show an overall depletion of ^{18}O and ^{13}C as a function of the extent of meteoric diagenesis. These data are used as analogs to carbonates that have been found in ALH84001.

Barrón V. Torrent J. Greenwood J. P. Blake R. E.
*Can the Phosphate Sorption and Occlusion Properties Help to Elucidate the Genesis of Specular Hematite
on the Mars Surface?* [#1853]

P sorption and occlusion properties of gray hematite are presented.

Vaniman D. T. Chipera S. J. Bish D. L. Carey J. W. Fialips C. I. Feldman W. C.
Sulfate Salts, Regolith Interactions, and Water Storage in Equatorial Martian Regolith [#1690]

Hydrated Mg-sulfates may occur on Mars. Interaction of Mg-sulfate solutions with clays, zeolites, or palagonite can form metastable hexahydrite (47 wt% H_2O) and extract Ca from solids to produce gypsum (21 wt% H_2O).

Barrón V. Torrent J.
Potential Pathways to Maghemite in Mars Soils: The Key Role of Phosphate [#1135]

Phosphate in media where Fe oxides are being formed favors the formation of maghemite (via ferrihydrite) or of its precursor lepidocrocite. This provides a simple explanation for the high concentration of maghemite in Mars soils.

Zolotov M. Yu. Kuzmin R. O. Shock E. L.
*Mineralogy, Abundance, and Hydration State of Sulfates and Chlorides at the Mars Pathfinder
Landing Site* [#1465]

Mass balance and thermodynamic calculations show that weathering crusts and rocks coatings at the MP landing site could be enriched in anhydrous Na sulfate, and soil is rich in hydrated MgSO_4 . Chlorine could be present in NaCl and/or hydrated MgCl_2 .