

Thursday, March 16, 2006
POSTER SESSION II: MARS SPECTROSCOPY AND REMOTE SENSING
7:00 p.m. Fitness Center

Michalski J. R. Ruff S. W. Christensen P. R. Cloutis E.
Thermal Emission Spectroscopy of Zeolite Minerals [#1146]

In this abstract, we discuss the infrared emission spectral characteristics of zeolite minerals — a potentially important group of minerals in chemical weathering environments on Mars.

Kraft M. D. Rampe E. Sharp T. G. Michalski J. R.

Thermal Emission Spectroscopy of Mixtures of Primary and Secondary Minerals Mixed in Controlled Experiments [#2457]

We are performing mineral mixing experiments to better understand the effects of thermal emission spectral mixing for spectra from weathered surfaces.

Kraft M. D. Michalski J. R. Sharp T. G.

Thermal Emission Spectral Modeling of Weathered Basalt Surfaces [#2449]

Mineral spectra from lightly weathered basalt surfaces mix nonlinearly, making it challenging to model primary and secondary mineralogy.

Presley M. A. Craddock R. A.

Thermal Conductivity Measurements of Natural Eolian and Fluvial Materials [#2327]

The results of thermal conductivity measurements of natural fluvial and eolian samples are presented. The larger particle sizes appear to control the thermal conductivity.

Presley M. A. Christensen P. R.

The Effect of Bulk Density on the Thermal Conductivity of Particulate Materials Under Martian Atmospheric Pressures [#2383]

The results of thermal conductivity measurements from several samples of various particle sizes and shapes over several different bulk densities will be presented. Under martian atmospheric pressures bulk density is a significant but minor effect.

Kuzmin R. O. Christensen P. R. Zolotov M. Yu. Anwar S.

Mapping of Seasonal Bound Water Content Variations on the Martian Surface Based on the TES Data [#1846]

We presented the results of the global mapping of the seasonal bound water content variations on the surface of Mars based on the TES data collected during three martian years.

Kirkland L. E. Herr K. C. Adams P. M.

The Primary Uncertainties in Infrared Spectral Studies of Mars [#1885]

Currently, the same infrared remote sensing data sets are interpreted as pointing both to a “cold/dry Mars” and a “watery past.” Here we explain the primary uncertainties in these data sets, and what work would reduce the current state of confusion.

McDowell M. L. Hamilton V. E. Riley D.

Effects of Weathering on TIR Spectra and Rock Classification [#2016]

Changes in mineralogy due to weathering are detectable in the TIR and cause misclassification of rock types. We survey samples over a range of lithologies and attempt to provide a method of correction for rock identification from weathered spectra.

Milam K. A. McSween H. Y. Jr. Moersch J. E. Christensen P. R.

The Accuracy of Derived Plagioclase Compositions from Multi-Component, Multi-Phase Sand Mixtures: Implications for Determining Martian Plagioclase Compositions [#1156]

Here we report the accuracy of derived plagioclase feldspar compositions from multi-phase mixtures analogous to typical martian lithologies.

Craig M. Cloutis E. A. Kaletzke L. McCormack K. Stewart L.

Alteration of Hydration Absorption Features in Reflectance Spectra of Selected Sulfates in a Low Pressure Environment: 0.45–4.3 μM [#2112]

Exposure of sulfates to a low pressure (0.01 Torr) carbon dioxide-rich atmosphere, and intense UV irradiation, results in significant and wide-ranging spectral changes. This has implications for the stability of sulfates on Mars.

Stewart L. Cloutis E. Bishop J. Craig M. Kaletzke L. McCormack K.

Classification of Iron Bearing Phyllosilicates Based on Ferric and Ferrous Iron Absorption Bands in the 400–1300 nm Region [#2185]

Iron-associated absorption features in a range of phyllosilicates show differences associated with the oxidation state of iron, in the 400–1300 nm range. However, no systematic variations are seen in the positions of these bands as a function of phyllosilicate structural type.

Lane M. D. Dyar M. D. Bishop J. L. King P. L. Cloutis E.

Laboratory Emission, Visible-near Infrared, and Mössbauer Spectroscopy of Iron Sulfates: Application to the Bright Paso Robles Soils in Gusev Crater, Mars [#1799]

The MER in Gusev crater has exposed in its tracks an unusual soil containing Fe(III)-sulfates at Paso Robles. Here we present a suite of Fe(III)-sulfate spectra measured using many spectroscopic techniques to identify the iron sulfate mineralogy.

Roush T. L. Esposito F. Rossman G. R. Colangeli L.

Gypsum Optical Constants in the Visible and Near-Infrared: Real and Imagined [#1188]

We compare gypsum optical constants (n and k), derived via two radiative transfer models (rtms), to independent and previously reported values. The rtms provide estimates of n and k in regions of weak absorptions, where previous models are insensitive.

Bishop J. L. Dyar M. D. Parente M. Drief A. Mancinelli R. L. Lane M. D. Murad E.

Understanding Surface Processes on Mars Through Study of Iron Oxides/Oxyhydroxides: Clues to Surface Alteration and Aqueous Processes [#1438]

Low-temperature oxidation and reduction reactions are being performed on hydrated ferric oxide minerals to investigate alteration under a variety of conditions on Mars. Samples are characterized with Mössbauer and visible-infrared spectroscopies.

Agresti D. G. Dyar M. D. Schaefer M. W.

Derivation of Velocity Scales for Mars Mössbauer Data [#1517]

An automated Windows-based procedure is introduced to calibrate the velocity of MER Mössbauer data, including correcting for velocity non-linearity and deriving the mm/s scale, which, along with spectral data, may be exported to file for later use.

Wang A. Freeman J. F. Jolliff B. L. Chou I. M.

Sulfates on Mars, a Systematic Raman Spectroscopic Study of Hydration States of Magnesium Sulfates [#2191]

The unique Raman spectral patterns and the systematic Raman peak shift permit accurate identification of the individual hydration states of Mg-sulfates from mixtures. These features were used to study the stability field and the pathway in de-/re-hydration processes of Mg-sulfates.

Sharma S. K. Chio C. H. Muenow D. W.

Raman Spectroscopic Investigation of Ferrous Sulfate Hydrates [#1078]

Our objective is to unambiguously distinguish between the mono-, tetra-, and heptahydrates of FeSO_4 that may be present on Martian surface. We have investigated these FeSO_4 hydrates with micro-Raman spectroscopy.

Jehl A. Pinet P. C. Cord A. Daydou Y. D. Baratoux D. Chevrel S. C. Manaud N. Greeley R. Kreslavsky M. A. Raitala J. Hoffmann H. Gwinner K. Scholten F. Roatsch T. Jaumann R. Neukum G. Mars Express HRSC Co-Investigator Team
Improved Surface Photometric Mapping Across Gusev and Apollinaris from an HRSC/Mars Express Integrated Multi-Orbit Dataset: Implication on Hapke Parameters Determination [#1219]
 Surface physical properties derived from HRSC multi-angular observations are determined and mapped for different units (volcanic plains, wrinkled terrains and dark wind streaks) present on the northern part of Gusev and to the north, toward Apollinaris Patera.

Le Deit L. Le Mouélic S. Combe J.-Ph. Hauber E. Gendrin A. Sotin C. Mège D. Bourgeois O. Bibring J.-P. OMEGA Science Team
Geology of East Candor Chasma, Mars Inferred from Analysis of OMEGA and HRSC Data [#2115]
 The analysis of the imaging spectrometer OMEGA data shows spectral signatures of ferric oxides in East Candor Chasma, Valles Marineris. The HRSC images are used to characterise the geomorphological context of the detected signatures.

Farrand W. H. Lane M. D.
Multi-Dataset Analysis of Surface Units and Landforms on the Northern Plains of Mars [#1499]
 Multiple orbital datasets are combined to constrain the origin of unusual surface units and small scale landforms on the northern plains of Mars. Relevance of these features to the action of water on the northern plains is considered.

Pinet P. C. Clenet H. Rosemberg C. Ceuleneer G. Heuripeau F. Harris E. Daydou Y. Baratoux D. Chevrel S. C. Launeau P. Combes J.-P. LeMouélic S. Sotin C.
Mantle Rock Surface Mineralogy Mapping in Arid Environment from Imaging Spectroscopy: The Case of Maqsad Peridotitic Massif in Oman and Implications for the Spectroscopic Study of Exposed Mafic Units on Mars [#1346]
 We present an assessment of the derivation of the mafic mineralogy using MGM technique and orbital data on the Maqsad massif (OMAN) and the implications for the study of mafic environments from OMEGA data on Mars.

Kim K. J. Boynton W. V. Finch M. Williams R. M. S. Reedy R. C. Drake D. M.
Effects of Rocks on Neutron and Gamma-Ray Production in Martian Surface Soil [#2356]
 We studied the effects of a dry rock sitting on a 3% water-containing martian-surface soil on neutron and gamma-ray fluxes. Rocks with radii of ~25 cm and bigger significantly affect these fluxes and the flux ratios of certain gamma rays.

Drost C. A. Wynne J. J. Chapman M. G. Kargel J. S. Titus T. N. Toomey R. S.
Remotely Sensed Cave Detection on Earth and Mars [#2103]
 The goal of this project is to improve capabilities for identifying caves on Mars, through: 1) studies of thermal properties and imaging of terrestrial caves; 2) computer modeling of cave thermal properties; and 3) GIS-aided analysis of Mars imagery for cave-like structures.

Putzig N. E. Mellon M. T.
Effects of Surface Heterogeneity on the Apparent Thermal Inertia of Mars [#2316]
 Apparent thermal inertia from 3 Mars years of MGS-TES data shows seasonal and diurnal variations as large as 200–600 J m⁻² K⁻¹ s^{-1/2} over most of the surface. We examine surface heterogeneity as the potential root cause for these variations.

Pitman K. M. Bandfield J. L. Wolff M. J.
MGS-TES Phase Effects and Thermal Infrared Directional Emissivity Field Measurements of Martian Analog Sites [#1336]
 We present a set of on- and off-nadir thermal IR field and laboratory emissivity spectra for three undisturbed Mars terrain analog sites and analyze them for presence or absence of directional emissivity effects. Comparisons to moderate and low albedo surface MGS-TES EPF sequences are discussed.

Heggy E. Carley R. A. Pommerol A. Clifford S. M. Morris R. V.

Density, Temperature and Frequency Dependent Model of the Dielectric Map of Martian Surface [#2140]

We present laboratory electromagnetic characterization of Mars analog soils as a function of the density, temperature and frequency. The results are integrated to form a parametric dielectric map of the martian surface.

Stillman D. E. Olhoeft G. R.

Electromagnetic Properties of Martian Analog Minerals at Radar Frequencies and Martian Temperatures [#2002]

EM properties of Martian analog minerals were measured at radar frequencies (using a vector network analyzer) and Martian temperatures. Grey hematite and magnetite possessed significant EM losses that could impact future Martian radar missions.