

Tuesday, March 18, 2003
MARS SURFACE COMPOSITION FROM INFRARED SPECTROSCOPY
8:30 a.m. Salon B

Chairs: H. Y. McSween
J. L. Bishop

Gendrin A. * Erard S.

A New Tool to Investigate Infrared Spectra, Based on Wavelet Filtering. Application to Hawaii [#1376]
A method to analyze imaging spectrometry data is presented. It permits automated detection and characterization of spectral features in large data sets. Its capabilities are assessed on an AVIRIS image cube acquired over the Hawaii volcanoes.

Poulet F. * Erard S. Mangold N.

The Surface Composition of Martian Low Albedo Regions Revisited [#1691]
The purpose of this work is to revisit the surface composition of dark regions by modeling ISM spectra representative of dark regions with a radiative transfer theory.

Steutel D. * Lucey P. G. Hamilton V. E.

A Reinterpretation of ISM Data: Quantitative Analysis of Pyroxene Compositions [#1898]
We have developed a quantitative model for determining pyroxene composition from 1- and 2- μ m band center locations. This model is applied to previously identified band centers in ISM spectra.

McSween H. Y. Jr.* Grove T. L. Wyatt M. B.

Basalt Versus Andesite in the Martian Crust: New Geochemical Perspectives [#1189]
Chemical compositions derived from deconvolved MGS/TES data for Mars surface types 1 and 2 constrain the materials that form the ancient crust and the processes that produced them.

Glotch T. D. * Morris R. V. Sharp T. G. Christensen P. R.

Characterization of the Effects of Precursor Mineralogy on Hematite Spectra: Application to Martian Hematite Mineralization [#2008]
Infrared spectra of the magnetite-precursor hematite samples were poor spectral fits for martian crystalline hematite spectra, while goethite-derived samples provided good fits. Data suggest that martian crystalline hematite could not have formed by the thermal oxidation of magnetite.

Kirkland L. E. * Herr K. C. Adams P. M. Salisbury J. W.

Hematite Coatings Match TES Spectra of Sinus Meridiani, Mars [#1944]
The hematite coating option is important because (1) hematite coatings can require little water to form, interrupting "hematite signature = abundant water" conclusions; and (2) researchers need to prepare for possible measurement by the 2003 rover.

Bandfield J. L. * Glotch T. D. Christensen P. R.

Spectroscopic Identification of Carbonates in the Martian Dust [#1723]
The spectral signature of surface dust isolated from the MGS-TES instrument indicates that a small amount of carbonate is present within a fine-particulate silicate matrix.

Seelos F. P. IV* Arvidson R. E.

Bounded Variable Least Squares — Application of a Constrained Optimization Algorithm to the Analysis of TES Emissivity Spectra [#1817]
A Bounded Variable Least Squares (BVLS) constrained optimization algorithm is applied to the analysis of TES emissivity spectra. The algorithm imposes parameter constraints without requiring the ejection of end-member spectra from consideration.

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

Thermal Emission Spectra of Silica-coated Basalt and Considerations for Martian Surface Mineralogy [#1420]

The composition of Martian dark regions has been interpreted as basalt plus andesite or altered basalt. Some "andesite" surfaces may be the result of coatings of secondary silica on basalt. We present laboratory spectra of silica-coated basalt.

Anderson F. S. * Hamilton V. E. Christensen P. R.

Mineralogy of the Valles Marineris: Initial Stratigraphic Results from Comparing TES Endmember Compositions with MOLA [#2022]

This study tests the proposition that data from the MGS TES and MOLA can be used to identify stratigraphic and mineralogic layering in the wall and floor deposits of the Valles Marineris (VM).

Wright S. P. * Ramsey M. S.

Spaceborne Thermal Infrared Data Analysis of Meteor Crater, Arizona: Analog for THEMIS Data of a Small Impact Crater in Syrtis Major [#1495]

Spaceborne thermal infrared (TIR) data is deconvolved to map the Meteor Crater ejecta lithologies using image endmembers and sample endmembers. An image end member analysis is performed for a fresh, small impact site in Syrtis Major for insight into ejecta composition and other crater properties.

Ruff S. W. * Christensen P. R.

Identifying Compositional Heterogeneity in Mars' Nili Patera Caldera Using THEMIS and TES Data [#2068]

The combination of THEMIS and TES data from Nili Patera caldera provide compositional and spatial information that can be used to interpret its volcanic history.

Morris R. V. * Graff T. G. Mertzman S. A. Lane M. D. Christensen P. R.

Palagonitic Mars from Rock Rinds to Dust: Evidence from Visible, Near-IR, and Thermal Emission Spectra of Poorly Crystalline Materials [#1874]

Palagonitic alteration rinds developed on basaltic rocks are spectral endmembers that provide a consistent explanation for both VNIR and TES data of Martian dark regions.