Gaussian Noise Removal for Wet Chemistry Data from the Phoenix Mission

We proposed an approach to remove white noise influence from the WCL data to obtain correct sensor readings, and to identify other chemical species present.


A 2-D XRD grain size estimation is performed on minerals of known sieve fraction grain sizes, and then applied to 2-D XRD data from the Mars Science Laboratory.

The combustion experiment on the Sample Analysis at Mars (SAM) Instrument Suite on the Curiosity Rover

The combustion experiment on the Sample Analysis at Mars (SAM) suite on Curiosity will heat a sample of Mars regolith in the presence of oxygen.

Methods for In Situ Radiometric Dating on Mars with Curiosity and Future Landers

In situ radiometric dating of the martian surface was done by MSL/SAM. One application of this result is to compare the K-Ar date with crater counting models.

Expansion of the ChemCam Calibration Database

The ChemCam laboratory testbed has been used to compile an expanded calibration database that better represents many of the martian observations.

Software Tools for Exploring and Analyzing ChemCam Data

Software (in Matlab) to allow rapid, flexible review of ChemCam data via graphs and tabular summaries to distinguish single and multiple phase targets.

Effects of Distance Correction on ChemCam LIBS Measurements (Sols 13 to 360)

We discuss the impact of observation distance on ChemCam LIBS measurements and provide a method using martian dust to correct individual emissions for distance.

ChemCam Data Processing: Dark Spectra and Their Role in the Detection of Hydrogen

Raw data are processed by subtracting a dark spectrum, which comprises a H absorption line from the solar spectrum. Discussion of implications for H detection.

Study Towards the Calibration of the Hydrogen Signal with Water Content as Measured by ChemCam in Martian Soils

Description of lab experiment using ChemCam EQM, preliminary results, and plans to help interpret the LIBS hydrogen signal acquired in martian soils.
Comparing LIBS Spectra from ChemCam Instrument on Board Curiosity (MSL) : How Different Can They Be and Still Be “The Same”? [#2817]

Reproducible measuring defines how different duplicate measurements can be. Stats allow such metric construction even with a planetary instrument such as ChemCam.

Unusual ChemCam Targets Discovered Automatically in Curiosity’s First Ninety Sols in Gale Crater, Mars [#1575]

We analyzed ChemCam spectra from MSL’s first 90 sols with the DEMUD prioritization algorithm. It flagged samples with unusual Ca, Na, Si, Al, and Mg peaks.

Denoising CRISM Images: A New Look [#2900]

We explore the potential of a novel denoising technique for CRISM data that addresses both column-dependent and spatially-localized spectral distortions.

Revised CRISM Spectral Parameters and Summary Products [#2444]

We assemble type spectra of the known diversity of minerals identified using CRISM data to update and fine-tune CRISM hyperspectral parameter formulations.

Building More Realistic Grain Shapes in Radiative Transfer Models of Mars Regolith [#2627]

We show numerical models replacing spheres with cubes and prisms as fundamental scatterers for Mars. Such edges remove resonance structure in phase functions.

Effects of Simulated Martian Impact Heating on Reflectance Spectra of Various Mars-Relevant Minerals [#2480]

The reflectance spectra of 47 different martian surface minerals were measured after heating to temperatures commonly observed after impact events.