

Abstract Submitted
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Linear Spectral Shift Determination of Hydrated Metallic Sulfates in Martian Regolith Simulant JSC Mars-1¹ KEITH ANDREW, Department of Physics and Astronomy, Western Kentucky University , KRISTOPHER ANDREW, Department of Physics and Astronomy, University of Kentucky , MELINDA THOMAS, Department of Physics and Astronomy, Western Kentucky University, ALICIA PESTERFIELD, Department of Chemistry, Western Kentucky University, QUENTIN LINEBERRY, JON PASCHAL , Applied Physics Institute — Recent data from the Curiosity and Opportunity Martian rovers coupled to the Mars THEMIS orbiter measurements have indicated that sulfur compounds play an important role in Martian meteorology. The unique identification and concentration of metallic sulfates in the Martian Regolith is critical to understanding the atmospheric and ground water dynamics on Mars. Metallic sulfates can form several hydrated states that can hold water in the Martian equatorial regions, can provide shielding from cosmic rays and solar radiation, can give rise to the development of an underground permafrost layer and can help form polar region ice. Following Sharma we combine Raman spectra of several hydrated sulfates that are imbedded in JSC-1 Martian regolith simulant at different concentrations and quantify the shift in peak values as a function of hydration. Different hydrated states have perturbed unit cell structures that cause the sulfate groups to oscillate with different symmetric and antisymmetric phonon mediated frequencies. Here we derive an explicit expression for the symmetric mode Raman iron based sulfate shift as a function of hydration and find the threshold detection level in the JSC-1 Martian Regolith.

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Keith Andrew
Department of Physics and Astronomy, Western Kentucky University

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