

## **Mineralogy of the Paso Robles soils on Mars**

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### **ABSTRACT**

Visible, near-infrared, thermal, and Mössbauer spectroscopic data from the exposed, bright track soil at the “Paso Robles” site within Gusev crater, Mars, indicate the presence of Fe<sup>3+</sup>-sulfates and possibly Fe<sup>3+</sup>-phosphates admixed with the host soil. When the spectroscopic analyses are combined with constraints imposed by chemical data, the determined dominant Fe<sup>3+</sup>-sulfate component is hydrous, and all of the spectroscopic methods suggest that it is probably ferricopiapite or some closely related, structurally similar species, possibly mixed with other Fe<sup>3+</sup> sulfates such as butlerite or parabutlerite, or perhaps (para)coquimbite, fibroferrite, or metahohmanite. Such an assemblage is consistent with formation in a highly oxidized, relatively dehydrated environment with the bulk-sulfate assemblage having OH/(OH + 2SO<sub>4</sub>) of < ~0.4. Some Fe<sup>3+</sup> is likely to be associated with phosphates in the soil in the form of ferristrunzite or strengite.

**Keywords:** Mars, spectroscopy, sulfate, phosphate, mineralogy, spectra, Paso Robles, acid