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Retrieving the Hydrous Minerals on Mars by Sparse Unmixing and the Hapke Model using MRO/CRISM Data

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Highlights

- A modified sparse unmixing (MSU) method combining the Hapke model with sparse unmixing is proposed for the retrieval of Martian hydrous minerals.
- To obtain reasonable results and reduce computation time, hydrous mineral identification is first performed using the spectral features of water absorption, and then the MSU method is applied to the identified regions.
- The most abundant hydrous mineral is Fe/Mg-phyllosilicate, with abundances ranging up to almost 30%, followed by prehnite and kieserite, with abundances lower than 15%.
- Ratioed spectra show high consistence with indicative absorption features of the hydrous minerals which are collected from CRISM spectral library.
- The results show consistency with related research and the *in situ* analyses of the rover Curiosity.

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