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A Review of Laboratory Experiments in Support of Interpretation of Hyperspectral Data from the Mars South Polar Residual Cap

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The Martian South Polar Residual Cap (SPRC) is a permanent region of CO_2 ice exhibiting unique, dynamic, flat floored, quasi-circular sublimation features known colloquially as Swiss Cheese Terrain (SCT). Sublimation processes can expose dust particles trapped within the ice during winter, which can be analysed using hyperspectral data from the Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) on board NASA's Mars Reconnaissance Orbiter (MRO). Work is being carried out to establish the composition of these dust particles, and look for evidence of organic molecules that may have been afforded protection within the SPRC from the deleterious effects of ultraviolet radiation on the Martian surface.

In this work we review laboratory experiments that have been carried out in order to better interpret CRISM spectra. In particular, SWIR (short-wave infrared) studies of CO_2 and H_2O ice/frost and dust mixtures, the behaviour of organic molecules in Martian conditions, and the angular reflectance measurements of such spectra. We will then briefly discuss what further work should be carried out to enable these measurements to be used to improve the interpretation of orbital hyperspectral data.

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