
**Mineralogical investigations at Canadian
Analogue Research Network (CARN) sites
using a portable Raman spectrometer**

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Presently, the search for life on Mars has focussed on minerals formed by chemical precipitation. Miniaturized Raman spectrometers have been proposed for future rover missions to Mars, such as the European Space Agency (ESA)'s ExoMars rover to be launched in 2013. A 10-week internship was dedicated to assisting a Canadian Space Agency project investigating the use of Raman spectroscopy on geological samples: carbonate and iron-oxides/iron-sulphate precipitates, for its potential applications on a Mars rover or lander. The off-the-shelf portable Raman spectrometer was tested at analogue sites in the central Yukon Territory and from the Haughton Impact Crater, Devon Island, Canada.

The Raman spectrometer utilizes a 120 mW laser with a wavelength of 785 nm. The instrument can detect Raman spectrum within the range of 100–2000 cm^{-1} at resolution of detection of 8 cm^{-1} . Preliminary assessments revealed that the instrument was able to conclusively identify carbonate (calcite and dolomite) and sulphate (gypsum) minerals. However, spectra from carbonate samples that had a high percentage of organic material (~5%) proved to be inconclusive: fluorescence from this organic material is thought to have caused interference with the Raman spectra.

With relatively minor upgrades, including a small, rugged computer, attachment stage, and fitted cover, the portable Raman spectrometer system used in this study could be functional in a field environment. However, to be more effective, this system would also benefit from a wider selection of standards in the library database and more effective matching criteria.