



Spectroscopic Raman study of powdered mineral samples in automatic mode for ExoMars mission operation simulation

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On the basis of the new scenario arising from the recent collaboration agreement between ESA and NASA ExoMars mission becomes the first key step for addressing essential questions related with the possibility to detect extinct or extant signs of life on Mars and with the detailed analysis of igneous and water altered minerals in the surface and subsurface .

Possible answers to these questions are supported by the instruments ExoMars payload, part of which is the Raman instrument. Raman spectroscopy is recognized a powerful technique for in situ analysis in a non destructive way of samples in the solid, liquid and gas state. Raman can identify minerals and organics at micro scale and within ExoMars operation mode will perform in-situ analysis of post-crushed samples obtained by the drilling system attached to the rover.

The analysis of powdered samples at the mineral grain scale implies scientific limitations because the context in which each grain is located becomes lost from the original piece before crushing. Nevertheless detailed spectroscopic mapping of the grain surface can supply very useful information about the samples.

In this work a simulator of the Raman operation mode inside ExoMars analytical laboratory is described and results obtained performing spectra in automatic mode on a series of mineral samples are presented and discussed. These results are compared with those obtained in the same samples using "bulk" techniques as FTIR in transmission mode and XRD diffraction.