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MicrOmega: a NIR hyperspectral microscope for in situ compositional analyses on board ESA/ExoMars.

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We are developing an ultra miniaturized “spectral microscope”, MicrOmega: it illuminates and images samples a few mm in size with a spatial sampling of 20 micrometer, and it acquires the near-infrared (0.8 to 4.0 micrometer) spectrum of each resolved pixel in more than 600 contiguous spectral channels. The goal of this instrument is to analyse the composition of collected samples at almost their grain size scale, in a purely non destructive manner, to enable further complementary analyses to be performed on the same samples. With the spectral range and resolution chosen, a wide variety of constituents can be identified: minerals, such as pyroxene and olivine, ferric oxides, hydrated phyllosilicates, sulfates and carbonates; ices and organics. The composition of the various phases within a given sample is a critical record of its formation and evolution. Coupled to the mapping information, it provides unique clues to decipher the history of the parent planetary body. In particular, the capability to identify hydrated grains and to characterize their adjacent phases has a huge potential in the search for potential bio-relics. We will present the major instrumental principles and specifications of MirOmega, and discuss its expected performances in the framework of the ESA/ExoMars mission.