



Topographic Confocal Raman Imaging – applications and potential in Geosciences

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Confocal Raman microscopy has found increasing relevance over the past years in various field of application in geo- and/or geobiology research. The benefit of obtaining molecular, compositional information on the submicron-scale in three dimensions was slightly alleviated by that “large” topography in the range of hundreds of micron or millimeters could not be analyzed without sample pretreatment, i.e. cutting or polishing to obtain a sufficiently flat surface. The new technique of Topographic Confocal Raman Imaging now allows analysis of rough surfaces or tilted samples.

The core element of this imaging mode is an integrated sensor for optical profilometry. Large-area topographic coordinates from the profilometer measurement are correlated with the large-area confocal Raman imaging data. This allows confocal Raman imaging along inclined or rough samples with the true surface held in constant focus while maintaining high level of confocality. The profilometry capabilities of True Surface Imaging mode allows scan ranges of up to 50x100 mm with a spatial resolution on the order of 100 nm vertically and 10 μm laterally. Measuring distances of 10 mm and more provide flexibility for variable sample size requirements. In combination with AFM, the profilometer can even be used as a pre-inspection tool to determine topographic features of interest for high-resolution AFM investigations on large samples.

The potential and examples for Geoscience applications will be shown.