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Multimodal Imaging of Heterogeneous Materials WEI LIU, JIANYONG YANG, WITec Instruments, THOMAS DIENG, UTE SCHMIDT, WITec GmbH — New materials for highly specified applicaltions can either have mono-atomic flat surfaces or a roughness of several hundred micro- or millimeter. In the past two decades, AFM was the main techniques used to characterize the morphology of nano-materials. On the other hand, Raman spectroscopy is known to be used to unequivocally determine the chemical composition of a material. By combining Raman spectroscopy with high resolution confocal optical microscopy, the analyzed material volume can be reduced below 0.02 μm^3, thus leading to the ability to acquire Raman images with diffraction limited resolution. The combination of confocal Raman microscopy with Atomic Force Microscopy (AFM) is a breakthrough in microscopy. Using such a combination, the high spatial and topographical resolution obtained with an AFM can be directly linked to the chemical information provided by confocal Raman microscopy. True Surface Microscopy, allows confocal Raman imaging guided by the surface topography obtained by an integrated non-contact optical profilometer. Large-area topographic coordinates from the chromatic confocal profilometer can be precisely correlated with the large area confocal Raman imaging data. This allows true surface Raman imaging on heavily inclined or rough surfaces, with the sample surface held in constant focus, while maintaining highest confocality. In summary, the combination of confocal Raman microscopy with AFM and true surface microscopy allows the characterization of materials at high, submicron resolution, as well as on mm-rough surfaces across large areas.

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