CONFOCAL RAMAN - AFM
A NONDESTRUCTIVE, HIGH-RESOLUTION SAMPLE ANALYSIS INSTRUMENT

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By combining Raman spectroscopy, a chemical analysis technique, with high resolution imaging methods such as Confocal Microscopy and Atomic Force Microscopy (AFM), the user is able to analyze chemical information with high spatial resolution. The Confocal Raman-AFM combines all three measuring techniques mentioned above in a single instrument. With the Confocal Raman Microscope (CRM), it is not only possible to obtain Raman spectra from extremely small sample volumes (down to 0.02 μm^3), but also to collect high resolution Raman images. In the Raman imaging mode, a complete Raman spectrum is acquired at every image pixel and the images are extracted by analyzing spectral features (sum, peak position, peak width, etc.). By simply rotating the microscope turret, the CRM is transformed into an AFM. With this technique, a sharp tip is scanned over the sample, providing high resolution 3D images below the diffraction limit. The highly resolved topographic structures observed with the AFM can then be linked to the chemical information obtained by the CRM.

To demonstrate the capabilities of this unique combination of measuring techniques, examples from various fields of applications such as biology, polymer, and semiconductor physics will be shown.