TOWARDS LARGE AREA HIGH RESOLUTION RAMAN MICROSCOPY

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Abstract

Raman spectroscopy is a commonly used analytical technique for identification of vibrational modes in molecular systems. It provides a fingerprint, by which specific molecule(s) can be identified. Raman spectroscopy can be performed at microscopic level using a Raman microscope by collecting spectra from a very small volume with lateral spatial resolution below one micron that is limited by light diffraction. In this contribution, we deal with Raman imaging. In the case of standard Raman microscopy, this technique is employed for examination of samples to obtain a 2D map of a small range of Raman shifts (direct Raman imaging) or thousands of spatially resolved Raman spectra from all over the field of view (hyperspectral imaging). Similar information can be obtained by using point illumination (e.g. in confocal configuration) and stage scanning.

The goal of this work is to present a way of construction of a low-cost Raman microscope and its combination with large area scanning probe microscopy [1], which enables creation of 2D multispectral high accuracy Raman images. Moreover, the correlative AFM-Raman imaging enables the user to get more information from one specific large area of interest. In contrast to commercial systems our positioning system is traceable to primary standards of length and is able to perform measurements with higher spatial accuracy.

Keywords: Raman spectroscopy, scanning probe microscopy, AFM

REFERENCES:

[1] Klapetek, P., et al. "Large area high-speed metrology SPM system.", Nanotechnology 26.6 (2015): 065501

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