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Abstract

Optoelectronic Sensory System for Raman Spectromicroscopes †

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Abstract: In order to obtain a high microscopic and spectral resolution, both for the microscopic study and for the spectrometric analysis carried out simultaneously at the same area of the sample, an adaptive optoelectronic system for Raman spectromicroscopes with a near-infrared excitation light source is designed. The current system and its working mode have a major disadvantage due to the fact that the sample is moved several times to and from the focusing lens of the excitation radiation in the search for the focal point in order to ensure the maximum spectral resolution. In this process, the peak height for the Stokes spectrum is monitored and the focal point is considered achieved when the peak height reaches its maximum. Due to the high energy density in a focal point, repeated searches of this point may lead to the modification of the chemical composition of the investigated material and, in some cases, even to the decomposition of some of its components. This paper presents an advanced technical solution that allows the microscopic study of the sample in the focal point of the visible spectrum, as well as the rapid and automatic search of the focal point in the Raman spectral analysis, at a wavelength of 1064 nm in the near-infrared spectral domain without thermally affecting the sample.

Keywords: Raman spectromicroscope; automatic focal point search

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