

Nanoobjects microscopy and Nanoplasmonics and surface enhanced spectroscopy

Functionalized probes – internal standard for TERS

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Tip-enhanced Raman scattering (TERS) is unique tool for the investigations on nanoscale. However this method does not provide analytical information as registered signal is proportional not only to the amount of a material but also to the unknown local enhancement factor.

There are different approaches to introduce an internal standard in TERS measurements registering reference signal from the substrate or additional material on the surface. However both these approaches have remarkable drawbacks. At the same time our proposal to use functionalized probes as an internal standard [1] is rather universal and elegant solution of the problem.

In this approach a constant amount of a reference material is carried to any point of measurements been chemisorbed on a tip. Such an introduction of the reference material into the area of signal generation is universal and does not contaminate the system of interest. In such a way variations of the reference signal from the substance deposited on the apex is proportional to the variation of the local enhancement factor what allows to use this signal for the normalization as the internal standard.

Important problem is the proportionality of signals from specimens deposited on the surface and on the apex. It is shown that the considered approach has advantage as not only removes fluctuations of the intensity of the exciting light but makes normalized results insensitive to feedback fluctuations too.

Few examples of the proposed internal standard are given.

1. *Bortchagovsky E.G., Schmid T., Zenobi R.* Internal standard for tip-enhanced Raman spectroscopy // *Appl. Phys. Lett.*-2013.-**103**.-P. 043111-1-3.