



Raman Spectroscopy on Plasmonic Materials: Recent Advances and Applications in Molecular detection

Plasmonic Enhancement of the electric field is the basis of the Surface-enhanced Raman Scattering technique (SERS). This technique is based on the localization of light in the nanoscale occurring in plasmonic materials and provides the best conditions for molecular detection, even single-molecule detection. This can only be achieved by the use of spectroscopy in the nanoscale. The building of functional nanostructured devices to obtain sensitive and selective platforms, with specific applications in molecular detection, biodiagnosis and Cultural Heritage is presented. Plasmonic effects are highly activated in nanostructures substrates containing tips or in interparticle gaps. The nanofabrication of metal nanoparticles with special morphology, such as nanostars is presented here for the specific case of silver. The functionalization with bifunctional molecules gives rise to highly active gaps that can be employed in the molecular detection of pollutants. Another important application of these nanostructured platforms is the functionalization with biological molecules for bioanalytical applications and the detection of colorants with interest for the Cultural Heritage.