

DEPARTMENT OF MOLECULAR SCIENCE AND NANOSYSTEMS

Seminars of the PhD Programme in Chemistry



Università
Ca' Foscari
Venezia

Recent Advances in Plasmonic-Enhanced Raman Scattering: Applications in Molecular Detection and Cultural Heritage

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Room Delta 0A

Abstract

Plasmonic-based spectroscopy (SERS and SEF) rely on the localization of light in the nanoscale occurring in plasmonic materials and provide the best conditions for molecular detection, even single-molecule detection. This can only be achieved by the use of spectroscopy in the nanoscale. The high sensing potential of these techniques is based on the huge field enhancement occurring on highly active plasmonic nanostructures as a consequence of the localized surface plasmon resonance (LSPR). Here the development of functional nanostructured devices to obtain sensitive and selective platforms, with applications in molecular detection, biodiagnosis and Cultural Heritage is presented. Plasmonic effects are highly activated in nanostructures substrates bearing a specific morphology or in interparticle gaps. The nanofabrication of metal nanoparticles with special morphology, such as nanoprisms or 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 bio-analytical applications and the detection of dyes.

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