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SERS-based femto-sensitive nanosensor for protein detection

Nekane Guarrotxena
Spanish National Research Council (CSIC), Spain

Highly sensitive technology allows the detection of analytical targets in one sample providing a rapid and accurate clinical diagnostic. Among the potential analytical techniques surface-enhanced Raman scattering (SERS) offers unique advantages such as ultrasensitive detection down low the deconvolution times, fingerprint vibrational information of the target molecules, and the possibility of performing the experiments even in complex biological samples. Surface plasmon resonance (SPR) refers to the collective oscillations of the conduction electrons in metallic nanostructures. This phenomenon can also concentrate the incident electromagnetic field leading to Raman signal amplification to be used in a surface enhanced Raman scattering based detection methodology. Here, we discuss the design strategies for nanostructures to plasmonically enhance optical sensing signals up to femtoMolar level, highlighting their applications as SERS-enhanced optical sensors in multiplexed protein detection. In fact, our strategy lies on the design of multicomponent nanostructures, which embody the sensitivity afforded by Surface Enhanced Raman Spectroscopy (SERS) nanostructures with the wide selectivity that is characteristic of antibodies.

Biography

Nekane Guarrotxena is a PhD from the University of Complutense, Madrid-Spain and Post-doctoral researcher at Ecole Nationale Superieure d´Arts et Metiers, Paris-France and the University of ScienceII, Montpellier-France. From 2008-2011, she was a visiting Professor in the Department of Chemistry, Biochemistry and Materials at the University of California, Santa Barbara (USA) and the CaSTL at the University of California, Irvine (USA). She is currently Research Scientist at the Institute of Polymer Science and Technology, CSIC-Madrid (Spain). Her research interest focuses on the synthesis and assembly of hybrid nanomaterials, nanoplasmonics, and their uses in nanobiotechnology applications (bioimaging, biosensing, drug delivery and therapy).

nekane@ictp.csic.es

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