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Rational clustering and fractionation of “SERS hot-spot” plasmonic nanoparticles

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Rational assembly of metal nanoparticles (NPs) is relevant for effective exploitation of structure-dependent material properties and for making nanostructured materials with specific activity in optical (sensing) and electronic (nanodevices) applications. Despite relevant improvements on solid surfaces, fabrication and organization of narrow size- and shape distributions of NPs in solution remain a challenge. One of the most successful approaches for their fabrication involves use of colloids and well-established thiolate adsorption chemistry. In this approach, dithiols can be used to bring together metal nanoparticles (Ag and Au) by virtue of metallic NP-sulfur bond formation. The general difficulty in this controlling aggregation methodology is that, the linking process is random by nature and is difficult to control, generating a statistical distribution of aggregated NPs. An alternative to non-ideal NPs assembly would be an effective post-synthetic purification method. In this presentation, we will focus on this approach for collecting efficient and intense optical SERS active nanostructure for novel applications from NP-assemblies pool. The contribution of the thiolated linker's nature on the final scattering response from the engineered assemblies will be also considered.

Biography

Nekane Guarrotxena has done her PhD from the University of Complutense, Madrid-Spain and Post-doctoral Research from the Ecole Nationale Supérieure of Arts and Crafts (ENSAM), Paris-France and the University of Science II, Montpellier-France. She was the Vice-Director of the Institute of Polymer Science and Technology (ICTP-CSIC) (2001-2005) and Visiting Professor at the University of California, Santa Barbara-USA and the CaSTL at University of California, Irvine-USA (2008-2011). She is currently a Research Scientist at ICTP-CSIC (Spain), Editorial Board Member of some Materials Science and Chemistry journals and External Expertise Consultant on I+D+I Management Policy for national and international agencies. Her research interest focuses on the synthesis and assembly of hybrid nanomaterials, nanoplasmonics, and their uses in nano biotechnology applications (bioimaging, drug delivery, therapy and biosensing).

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