

Plasmonic Nanomaterials

Plasmonic Nanomaterials - SERS series

Nanofaber offers a unique selection of plasmonic nanoparticles and hollow nanoreactors capable of concentrating light at the nanometer scale for the simultaneous performance and optical monitoring of thermal-activated reactions at a given wavelength. These reactors can feature the encapsulation of plasmonic nanoparticles on the inner walls of a mesoporous silica capsule. A Diels-Alder cycloaddition reaction can be carried out in the inner cavities of these nanoreactors to track their efficacy and demonstrate that reactions can be accomplished in a confined volume without alteration of the temperature of the bulk solvent, while allowing a real time monitoring of the reaction progress. When used as plasmonic nanoprobe for surface enhanced Raman spectroscopy (SERS), our nanoreactors NFSERS20 proved effective as intracellular hybrid SERS sensor for relevant signaling molecules. As an example, after inner functionalization with a NO chemoreceptor, our sensor nanocapsule performed in-situ, is quantitative real-time monitoring of the dynamics of intracellular NO in living cells while remaining fully biocompatible. Its sophisticated design prevents the interaction of cytosolic macromolecules within the active optical material and the enzymatic degradation of the sensor. It additionally facilitates the diffusion of small molecules between the interior and exterior thanks to the plasmonic thermal gradients generated upon their illumination. These materials open endless applications in life science, drug delivery, smart scaffolding, packaging, bioremediations, as well as energy and concentrated solar power as low emitting surface coating. SERS products for sales are listed in the table

| PRODUCT TYPE | PRODUCT CODE | DESCRIPTION |
|-----------------------------|--------------|---|
| NANORODS | NFSERS00 | Tunable 500-1100 nm range |
| NANOSTARS | NFSERS10 | Tunable 500-1100 nm range |
| NANOCAPSULES – SINGLE LAYER | NFSERS20 | Tunable 500-1100 nm range |
| NANOCAPSULES - DOUBLE LAYER | NFSERS30 | Tunable 500-1100 nm range For high temperature application |

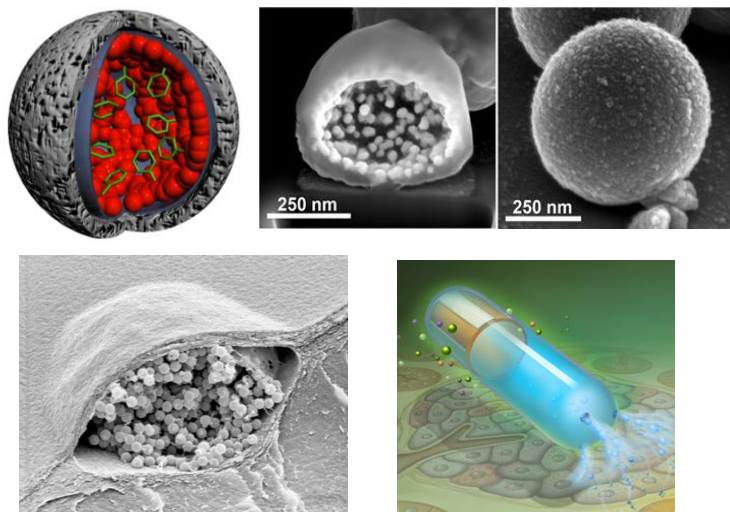


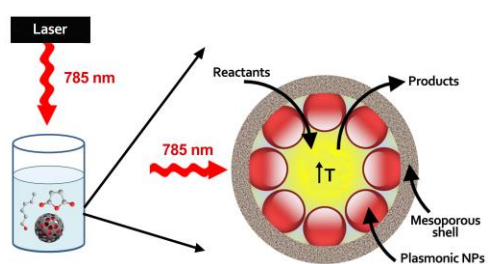
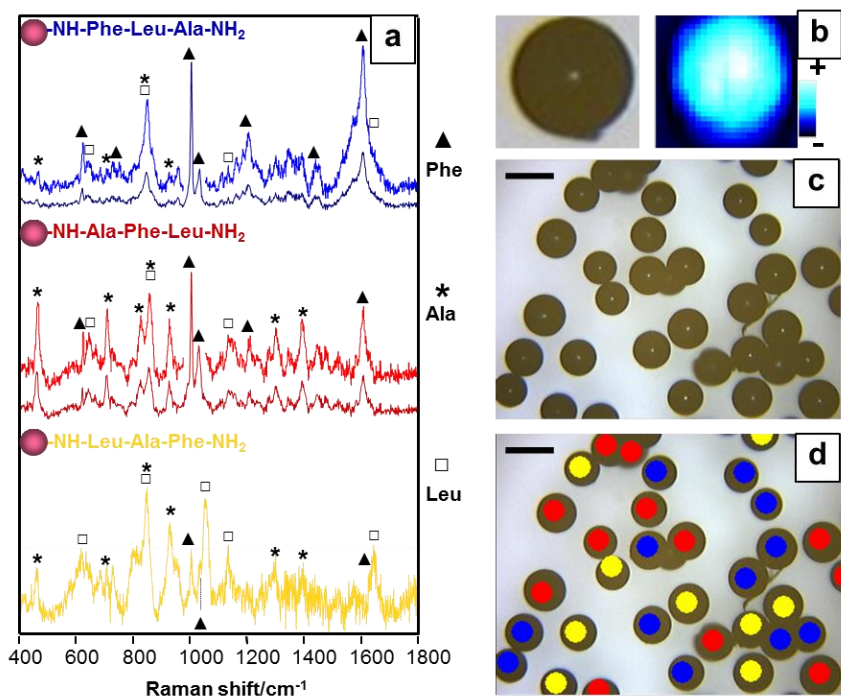
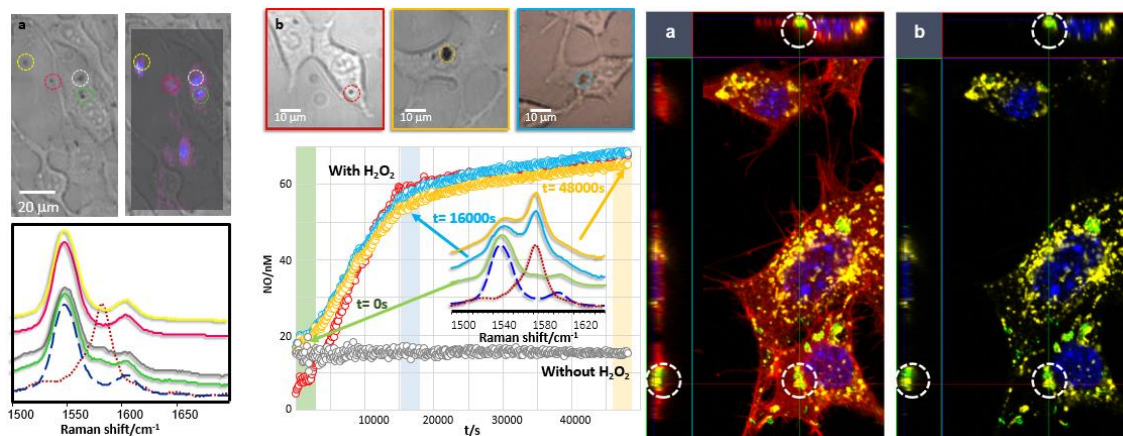
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Graphics Schematic cross-section view of the plasmonic nanoreactors developed in this work where reactants and products diffuse through the mesoporous silica shell and a NIR-laser irradiation promotes the chemical reaction allowing a simultaneous in situ SERS monitoring of the process.