SERS-Based Sensing and Imaging in Complex Cell Models

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Nanoplasmonics involves the manipulation of light using materials with significantly smaller sizes than the radiation wavelength. This usually involves nanostructured metals, which very efficiently absorb and scatter light because of their ability to support coherent oscillations of free (conduction) electrons. Therefore, an essential pillar behind the development of nanoplasmonics is the great advance in fabrication methods, which have achieved an exquisite control over the composition and morphology of metal nanoparticles. Colloid chemistry has the advantage of simplicity and large-scale production, with the ability to direct not only nanoparticle morphology but also surface properties and subsequent processing via self-assembly. This talk will provide an overview of the fabrication of “nanoplasmonics” building blocks and their integration in materials and devices that can be used for real applications in sensing and diagnostics. In particular, it will focus on the application of nanostructured plasmonic substrates comprising micropatterned Au nanoparticle superlattices and 3D-printed hybrid scaffolds, to the precise SERS detection of selected tumor metabolites which shape the cancer landscape (e.g ACS Nano 2024, 18, 11257; Advanced Drug Delivery Reviews 2022, 189, 114484; Chem. Soc. Rev., 2024, 10.1039/D3CS01049J).