Building hot spots in different plasmonic nanoparticles from a cruciform bifunctional dipyridine anthracene

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In this work, the adsorption of a type of cruciform system integrated by an anthracene central part and two side chains with a pyridine-vinyl structure (DPAC) was studied on plasmonic nanoparticles of silver and gold. The adsorption was investigated by surface-enhanced Raman scattering, which reveals very valuable information about both the interaction mechanism and the molecular orientation. The highest Raman enhancement was measured on Ag nanostars due to the combination of gaps and tips in these nanostructures. The changes observed in the surface-enhanced Raman scattering spectra indicate that the adsorption of DPAC on the metal is bifunctional in the case of Ag and Au nanoparticles. Considering that the Raman signals enhancement is several orders of magnitude higher in gaps in relation to regions out of these areas, it is estimated that the enhancement ability of DPAC in Ag nanostars is so high that it allows the detection of a concentration close to pM.