Surface-enhanced micro-raman detection and characterization of calix[4]arene-polycyclic aromatic hydrocarbon host-guest complexes

Leyton, P.

Sanchez-Cortes, S.

Campos-Vallette, M.

Domingo, C.

Garcia-Ramos, J. V.

Saitz, C.

Surface-enhanced micro-Raman spectroscopy (micro-SERS) was used to detect traces of the hazardous pollutant polycyclic aromatic hydrocarbons (PAHs) pyrene and benzo[c]phenanthrene deposited onto a calix[4]arene-functionalized Ag colloidal surface. High spectral reproducibility and very low molecular detection limits (10 8 M) were obtained by using 25,27-carboethoxy-26,28-hidroxy-p-tertbutylcalix[4]arene as host molecule. Films of immobilized aggregated Ag nanoparticles, obtained by chemical reduction with hydroxylamine, were prepared by direct adhesion on a glass surface. The influence of the aggregation degree of the initial Ag nanoparticles on the micro-SERS detection effectiveness was checked. Different relative concentrations of the host (calixarene receptor) and the guest (PAHs) were attempted in order to optimize detection of the pollutant. The obtained results indicated that the detection limit is much lower in the case of benzo[c]phenanthrene than in pyrene when exciting with