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AMEND

CONTINUE

Submission ID

186

Title (required)

Magneto-responsive SERS-active nanocomposites tailored for quick detection and efficient removal of pollutants from water

Abstract (required)

Nanocomposites are generally composed of different kinds of functional nanostructures. Each of them possesses unique properties that should be preferentially inherited and provide multifunctionality to the final nanocomposite. In this contribution, we are combining plasmonic Au nanoparticles which are generated in the close vicinity of a magnetic core, represented either by Fe_3O_4 , and/or CoFe_2O_4 . Due to the presence of plasmonic nanoparticles, surface enhancement of Raman scattering (SERS) can be used to unambiguously detect a pollutant based on its vibrational fingerprint pattern; simultaneously, the presence of magnetic core enables pollutant molecules removal via magnetic separation. So far, SERS-detection and removal of model pollutants have been proven for the case of cationic as well as anionic heteroaromatic macrocycles, porphyrins. SERS signal from micromolar concentrations of porphyrins was repeatedly obtained using 785 nm excitation laser line (300 mW), applied for 2 minutes; thus, the detection is fast and useful at sufficiently low concentrations of porphyrins serving as an example. Magnetic separation of the nanocomposites with irreversibly bound porphyrins is finished within a few minutes and the resulting supernatant provides just Raman signal of water. This can be regarded as the first proof of our nanocomposite's applicability. These nanocomposites are further surface modified to become recyclable and exploitable for the detection and removal of selected molecules, such as fructose, or amikacin, as we envisage within our running research project.

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