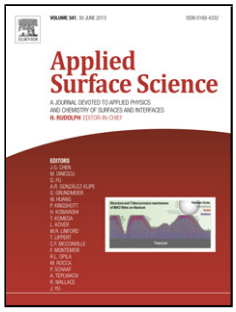

Title: Novel Ferroferric oxide/Polystyrene/ Silver Core-Shell Magnetic Nanocomposite Microspheres as Regenerable Substrates for Surface-Enhanced Raman Scattering

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Highlights:

1. The ferroferric oxide/polystyrene/ silver particles with a well-defined core-shell structure have been synthesized.
2. The composite particles provide excellent SERS performance and have a detecting limit of 10^{-10} M R6G.
3. The composite particles show superior stability and reproducibility for SERS application.

Abstract

A novel Ag-coated Fe_3O_4@Polystyrene core-shell microsphere has been designed *via* fabrication of Fe_3O_4@Polystyrene core-shell magnetic microsphere through a seed emulsion polymerization, followed by deposition of Ag nanoparticles using in-situ reduction method. Such magnetic microspheres can be utilized as sensitive surface-enhanced Raman scattering (SERS) substrates, using Rhodamine 6G (R6G) as a probe molecule, with both stable and reproducible performances. The SERS detection limit of R6G decreased to 1×10^{-10} M and the enhancement factor of this substrate on the order of 10^6 was obtained. In addition, owing to possessing excellent magnetic properties, the resultant microspheres could be separated rapidly by an external magnetic field and utilized