Abstract

In this research, a polymer brush-grafted magnetic nanoparticles (hairy MNPs) was synthesized by surface-initiated atom transfer radical polymerization. First, magnetic nanoparticles were covered with silica (magnetic core-shell nanoparticle) and then the polymer grafted on the corresponding nanoparticles. The adsorbent was characterized using Fourier transform-infrared (FT-IR), Scanning electron microscopy (SEM), Thermogravimetric analysis (TGA) and powder X-Ray diffraction (XRD). This composite was then used for extraction and analysis of polycyclic aromatic hydrocarbons (PAHs, 9 compounds) by solid phase extraction and gas chromatography-mass spectrometry (GC-Mass). The factors affecting extraction such as: amount of adsorbent, adsorption time, type and volume of solvent, and desorption time were studied and optimized. In the optimized conditions, the limits of detection (LOD) was achieved in the rang 1-10 ngL^{-1} and the repeatability was 0.8-2.3 %. Furthermore, under optimal conditions, this method was used for effective adsorption of PAHs in real samples such as the city water and well water.

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Extraction and determination of polycyclic aromatic hydrocarbons in aqueous media using polymer brush coated magnetic nanoparticles and gas chromatography-mass spectrometry

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