Preparation and characterization of magnetic nanoparticles coated with polyethylene glycol

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Abstract: Magnetic nanoparticles Fe₃O₄ were prepared in air environment by the coprecipitation method using molar ratios of Fe²⁺: Fe³⁺ 1: 2. The surface of magnetic nanoparticles was coated with sodium oleate as the primary layer and polyethylene glycol 6000 (PEG-6000) as the second layer. The morphology of the particles was investigated by scanning electronic microscopy (SEM). X-ray diffraction (XRD) indicated the sole existence of inverse cubic spinel phase of Fe₃O₄ and an average size of about 25 nm. Fourier transform infrared spectroscopy (FTIR) analysis indicated existence of two distinct surfactants on the particle surface. In addition, the results of FT-IR indicated that the coated Fe₃O₄ particles improved the thermal stability due to the interaction between the Fe₃O₄ particles and protective layers. © 2009 IOP Publishing Ltd.

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