

Preparation and characterization of magnetic nanoparticles coated with polyethylene glycol

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Abstract: Magnetic nanoparticles Fe_3O_4 were prepared in air environment by the coprecipitation method using molar ratios of $\text{Fe}^{2+} : \text{Fe}^{3+} = 1 : 2$. 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 Fe_3O_4 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 Fe_3O_4 particles improved the thermal stability due to the interaction between the Fe_3O_4 particles and protective layers. © 2009 IOP Publishing Ltd.

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