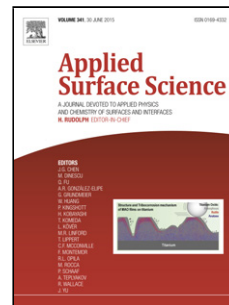


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Structural characterization of copolymer embedded magnetic nanoparticles

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Abstract

Small magnetic nanoparticles (Fe_3O_4) were synthesized by co-precipitation and coated by emulsion polymerization with poly(methyl methacrylate-co-acrylic acid) (PMMA-co-AAc) to create surface functional groups that can attach drug molecules and other biomolecules. The coated and uncoated magnetite nanoparticles were stored for two years in normal closed ships and then characterized by Fourier transform infrared spectroscopy, X-ray diffraction, transmission electron microscopy, vibrating sample magnetometry and electron paramagnetic resonance spectroscopy. The solid phase transformation of magnetite to maghemite, as well as an increase in particle size were evidenced for the uncoated nanoparticles. The coated nanoparticles preserved their magnetite structure and magnetic properties. The influences of monomers and surfactant layers on interactions between the magnetic nanoparticles evidenced that the thickness of the polymer has a significant effect on magnetic properties.

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