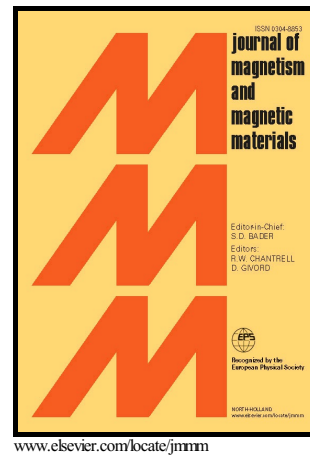


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Precipitation synthesis and magnetic properties of self-assembled magnetite-chitosan nanostructures

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Abstract

This paper reports the synthesis and magnetic properties of unique magnetite-chitosan nanostructures synthesized by the chemical precipitation of magnetite nanoparticles in the presence of chitosan. The influence of varying synthesis parameters on the morphology of the magnetic composites is determined. Depending on the synthesis parameters, magnetite-chitosan nanostructures of spherical (9–18 nm), rice-seed-like (75–290 nm) and lumpy (75–150 nm) shapes were obtained via self-assembly. Spherical nanostructures encapsulated by a 9–15 nm chitosan layer were assembled as well. The prospective morphology of the nanostructures is combined with their excellent magnetic characteristics. It was found that magnetite-chitosan nanostructures are ferromagnetic and pseudo-single domain. Rice-seed-like nanostructures exhibited a coercivity of 140 Oe and saturation magnetization of 56.7 emu/g at 300 K. However, a drop in the magnetic properties was observed for chitosan-coated spherical nanostructures due to the higher volume fraction of chitosan.

Keywords

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