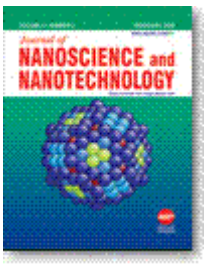

Characterization of the Biocompatible Magnetic Colloid on the Basis of Fe_3O_4 Nanoparticles Coated with Dextran, Used as Contrast Agent in Magnetic Resonance Imaging

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Abstract | References | Citations | Supplementary Data | Suggestions

The magnetic resonance imaging contrast agent, the so-called Endorem™ colloidal suspension on the basis of superparamagnetic iron oxide nanoparticles (mean diameter of 5.5 nm) coated with dextran, were characterized on the basis of several measurement techniques to determine the parameters of their most important physical and chemical properties. It is assumed that each nanoparticle is consisted of Fe_3O_4 monodomain and it was observed that its oxidation to γ-Fe_2O_3 occurs at 253.1 °C. The Mössbauer spectroscopy have shown a superparamagnetic behavior of the magnetic nanoparticles. The Magnetic Resonance results show an increase of the relaxation times T_1, T_2, and T^*_2 with decreasing concentration of iron oxide nanoparticles. The relaxation effects of SPIONs contrast agents are influenced by their local concentration as well as the applied field strength and the environment in which these agents interact with surrounding protons. The proton relaxation rates presented a linear behavior with concentration. The measured values of thermo-optic coefficient $\partial n/\partial T$ thermal conductivity κ, optical birefringence Δn_0, nonlinear refractive index n_2, nonlinear absorption β and third-order nonlinear susceptibility $|\chi^{(3)}|$ are also reported.

Keywords: CONTRAST AGENT; DSC; ENDOREM; IRON OXIDE; MOSSBAUER; NANOPARTICLE; RELAXATION RATE; XRD; Z-SCAN

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