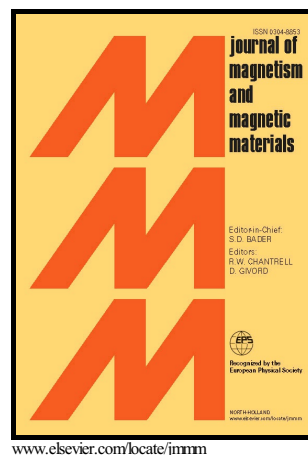


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The influence of surface modification, coating agents and pH value of aqueous solutions on physical properties of magnetite nanoparticles investigated by ESR method

Bernadeta Dobosz<sup>1\*</sup>, Ryszard Krzyminiewski<sup>1</sup>, Joanna Kurczewska<sup>2</sup>, Grzegorz Schroeder<sup>2</sup>

<sup>1</sup>Medical Physics Division, Faculty of Physics, Adam Mickiewicz University, Umultowska 85, 61-614 Poznań, Poland

<sup>2</sup>Faculty of Chemistry, Adam Mickiewicz University, Umultowska 89B, 61-614 Poznań, Poland

\*Corresponding author. Bernadeta Dobosz, PhD Medical Physics Division Faculty of Physics Adam Mickiewicz University Umultowska 85 61-614 Poznań, Poland Tel.: +48 61 829 5180; fax: +48 61 829 5189; benia@amu.edu.pl

### Abstract

The article presents the results of electron spin resonance (ESR) studies for aqueous solutions of functionalized superparamagnetic iron(II,III) oxide nanoparticles. The samples studied differed in type of organic ligands at the magnetite surface, type of coating agent and pH value of aqueous solutions. The ESR spectra of the samples were obtained at room temperature and at 230 K. The field cooling (FC) experiment was performed for selected samples, and the effective anisotropy field ( $H_{K2}$ ) and the first order magnetocrystalline anisotropy constant ( $K_1$ ) was calculated. The process of the nanoparticles diffusion in different environments (human blood, human serum) forced by an inhomogeneous magnetic field was monitored and their interactions with different solvents have been discussed. It has been shown that ESR method is useful to observe the impact of organic ligands at the magnetite surface, type of coating agent and pH value of aqueous solutions on the properties of iron(II,III) oxide nanoparticles.

**Keywords:** electron spin resonance, magnetite, 4-Amino-TEMPO, coating agents, diffusion

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