Characterization of Cobalt Ferrite Magnetic Nanoparticles for Magnetic Hyperthermia Application

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Abstract. In presented study we describe the magnetic properties of cobalt ferrite nanoparticles with the size of around 5 nm prepared by co-precipitation chemical way. To verify the application potential of $CoFe_2O_4$ magnetic nanoparticles, the measurements to determine the magnitude of the magnetic moment, the pre-relaxation constant, the size of their cores were realized. The results of TEM measurement confirm the presence of spherical isolated particles with average size of 3,8 nm. The DC magnetization measured in ZFC and FC regimes confirm the presence of superparamagnetic state with blocking temperature of around 50 K. The AC susceptibility data were fitted to Neel-Arrhenius and Vogel-Fulcher models and the value of energy barrier to magnetization reversal E_A/k_B= 225 K and pre-relaxation constant associated with relaxation time of τ_0= 51.10^{-08} s were obtained. The analysis of magnetic measurements also shows that they exhibit properly magnetic properties for their potential use in magnetic particle hyperthermia.