Nanocomposites and nanomaterials

Study of magnetic and structural properties of cobalt-manganese ferrite nanoparticles obtained by mechanochemical synthesis

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Over the past decade transition metal oxides MFe_2O_4 (M= Co, Ni, Mn) attracted particular interest because of its unique optical, magnetic and sorption properties. Such oxide-based magnetic nanoparticles have a wide technological applications in the areas of high density data storage, ferrofluids etc.[1] Lately, however, many efforts have been made to apply such magnetic particles in medicine: cancer therapy by hyperthermia, controlled drug delivery, separation of cells and magnetic resonance imaging [2-3].

This study presents the nanoparticles of $CoFe_2O_4$ and $MnFe_2O_4$ prepared by mechanochemical synthesis using high-energy ball mill and inorganic salt NaCl as a growth agent for further biomedical applications.

Mössbauer spectroscopy (Fig.1), magnetization studies, TEM were used to determine the properties and composition of the nanoparticles depending on the condition of the synthesis.

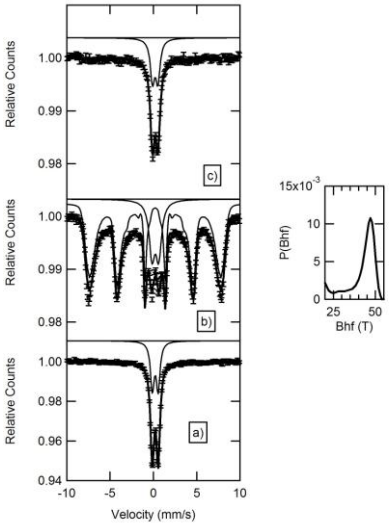

Fig.1. The Mössbauer spectra
a) $CoFe_2O_4$ synthesized without growth agent;
b) $CoFe_2O_4$ synthesized with growth agent;
c) $MnFe_2O_4$ synthesized without growth agent.

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