

Title: Preparation and characterization of bi-phasic magnetic nanoparticles

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Abstract

The work is focusing on the magnetic properties of ferrimagnetic spinel ferrites before and after the introduction of a shell on a core particle with different magnetic properties. The core nanoparticles were prepared by hydrothermal decomposition of oleate precursors. The introduction of shell was carried out by hydrothermal treatment of the already prepared core particles.

The phase composition, spinel structure and the sizes of the prepared samples were investigated by powder X-ray diffraction and by transmission electron microscopy. Formation of the shell on top of the core particle was determined indirectly, using Mössbauer spectroscopy at room temperature. The interparticle interactions and the particle shape was studied by small angle X-ray scattering. The magnetic properties of the prepared samples were measured on a SQUID magnetometer.

Key words: magnetic nanoparticles, core, shell, spinel structure, powder X-ray diffraction, Mössbauer spectroscopy, magnetic measurements, TEM