

STUDIES OF THE IRON OXIDES NANOPARTICLES BY MEANS OF MÖSSBAUER SPECTROSCOPY

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In last decades the nanotechnology become very important subject in physics, medicine, biology and chemistry. The driving force of the nanoparticle research are due to the potential applications. The reduced dimension leads to the new chemical and physical properties, which are not known from the bulk or thin films materials. The origin of the novel properties is mainly related to the large surface-to-volume ratio, broken symmetry at the surface of the nanoobjects, changed the electronic structure. In such systems the quantum-size effects often must be taken into account for interpretation of the results.

The chemical route to prepare nanoparticles is the optional one to many proposed by physical means. However, it was observe before that the conditions of the sample preparation have large influence on the properties of the final particles. Nominally the same samples are showing different Mössbauer spectra, what suggests the influence of chemical environment of the particles on the magnetic properties of the structure. In this paper we are studied the relation between the oxide particles formation condition and their properties. We are focused on the problem of the nonhomogeneity of the particles. We are trying to find the exact way how to test the sample to be sure that the particles are single phase. In the studies to the problem of the separation of the different type of the oxides we are faced. Quite significant influence on the particle size from the substitution elements are observed.

The Mössbauer spectroscopy is used as a main tool of characterization of the system since the method is very sensitive to any modification of the composition and the structure.