

## Influence of the emulsion parameters on the size of nanoparticles of Fe<sub>3</sub>O<sub>4</sub> under heterophase synthesis

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### Abstract

In this paper, the technique of heterophasic one step synthesis of nonpolar organosol of nanoscale Fe<sub>3</sub>O<sub>4</sub> has been worked out. The synthesized samples of nanoparticles Fe<sub>3</sub>O<sub>4</sub> were investigated by infrared Fourier transform spectroscopy (FT-IR), X-ray diffraction (XRD), dynamic light scattering (DLS), and transmission electron microscopy of high resolution (HRTEM). The boundary conditions were defined for the synthesis of Fe<sub>3</sub>O<sub>4</sub> nanoparticles by the developed method. The effect of the emulsion type, the phase relationship, the hydrodynamic parameters of emulsification, the ratio of stabilizer/Fe<sub>3</sub>O<sub>4</sub>, HLB the surfactants entered into the system at an average hydrodynamic size of particles and their size distribution in the organosol have been investigated. It has been shown that the surface area of the phase boundary has a decisive influence on the size of nanoparticles. It was established that this method is applicable for the synthesis of monodisperse nanoparticles Fe<sub>3</sub>O<sub>4</sub> with the size up to 1 nm having an affinity to non-polar liquid media.