

SENSITIVITY OF SMALL-ANGLE  
NEUTRON SCATTERING METHOD  
AT DETERMINING THE STRUCTURAL  
PARAMETERS IN MAGNETIC  
FLUIDS WITH LOW MAGNETITE  
CONCENTRATIONS

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S u m m a r y

The capabilities of the small-angle neutron scattering (SANS) method for the research of various magnetic fluids with low magnetite concentrations ( $\sim 0.1$  vol.%), when the structural factor effect is absent, have been considered. The structural parameters of nanoparticles (the magnetic coherent scattering length density, thickness of a nonmagnetic layer on the surface of magnetic nanoparticles, and thickness of a stabilizing shell), which can be obtained from SANS experiments and the Guinier parameters for the scattering intensity, were analyzed in the framework of the “spherical core-shell” model. The model is found to be sensitive to a variation of the structural parameters of magnetic fluids if the particle polydispersity is taken into account. Experimental conditions for magnetite/oleic acid/benzene (a nonpolar carrier fluid) and magnetite/oleic and dodecyl-benzenesulphonic acids/pentanol (a polar carrier fluid) ferrofluids are selected and compared.