

SMALL-ANGLE NEUTRON SCATTERING  
BY WATER-BASED FERROFLUID MIXED  
WITH POLYETHYLENE GLYCOL

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S u m m a r y

A new approach in the contrast variation experiments (small-angle neutron scattering) is demonstrated with a complex water-based magnetic fluid, where magnetite nanoparticles (size about 10 nm) coated with sodium oleate are mixed with poly(ethylene glycol), PEG. The contrast variation is performed basing on the substitution of hydrogen with deuterium in the liquid carrier (water). Modified basic functions defined for the polydisperse multicomponent superparamagnetic system are analyzed. Two kinds of particles in the solution, which are fractal aggregates (size more than 120 nm) of magnetite nanoparticles coated with sodium oleate and micelles (radius about 2 nm) of free sodium oleate, are revealed. It is shown that PEG substitutes sodium oleate in the initial ferrofluid. Aggregates are formed because of its worse stabilizing properties with respect to nanomagnetite in water.