

Isoscattering point in SANS contrast variation studies of core-shell nanoparticles

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Core-shell nanoparticles are widely spread in advanced technologies. Small-angle neutron scattering (SANS) is actively used in their structural diagnostics [1,2]. Providing H/D isotopic substitution in the liquid carrier of magnetic fluids lets adjusting the neutron scattering length density (SLD) of the solvents in a frame of the contrast variation technique [3].

There are specific points at which the neutron scattering intensity from the liquid system is independent of the SLD contrast between dispersed particles and dispersing media. These points, q , are referred to as 'isoscattering points' [4]. q^{**} is inversely proportional to the particle size. Usually, the nature of the isoscattering point is associated with the high symmetry of the nanoparticle shape and low polydispersity. Here we discuss the conditions for observing an isoscattering point for polydisperse core-shell structures, as well as additional possibilities of structural characterization via SANS based on this effect.

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