

Analysis of two-level organization of detonation nanodiamond clusters by SANS

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The influence of model selection for data processing of small-angle neutron scattering (SANS) by fractal clusters of detonation nanodiamonds in powders [1] and aqueous dispersions [2] is discussed. In addition to previous work we focus our attention on the analysis of the scattering, corresponding to the level of nanocrystallites, taking into account the polydispersity. It was shown that the model of the diffusion surface corresponding to the graphene shell of the nanocrystallites agrees with the contrast variation data in the aqueous dispersions (mixtures H₂O/D₂O) against the average characteristics, and explains the differences in average grain size determined by small-angle neutron scattering and X-ray diffraction (broadening of the peaks). However, direct determination of the form and parameters of the distribution function of crystallite size encounters difficulties due to the irregular structure of the surface. In particular, determined structural parameters of the particles strongly depend on the type of model distribution function and the residual background.

[1] M.V. Avdeev, V.L. Aksenov, L. Rosta, *Diamond Related Mater.* **16**, 2050 (2007).

[2] M.V. Avdeev, N.N. Rozhkova, V.L. Aksenov, V.M. Garamus, R. Willumeit, E. Osawa, *J. Phys. Chem. C* **113**, 9473 (2009).