Detonation synthesis of non-agglomerated metallic nanoparticles deposited on carbon supports

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Synthesis of nanoparticles is carried out by thermal decomposition of organometallic complex compounds in the detonation front of explosives, where the temperature reaches several thousand degrees. The low concentration of metals in the total mass of the charge leads to the formation of single non-agglomerated nanoparticles deposited on detonation carbon. At the same time, the morphology of detonation carbon and its amount depends on the properties of the explosive. The metallic nanoparticles in detonation products are determined by the high-resolution transmission microscopy. Depending on the conditions, the rounded particles with sizes from 1 to 100 nm are formed. The formation of nanoparticles behind the detonation front is observed by the dynamical measurements of of small-angle X-ray scattering of synchrotron radiation during the detonation. This work was supported by the Russian Foundation for Basic Research (grant No. 16-29-01050).