

Dynamic and static investigation of explosion nanodiamonds

Rubtsov I.A.¹, Ten K.A.¹, Titov V.M.¹, Prueel E.R.¹, Kashkarov A.O.², Kremenko S.I.², Zubavichus Ya.V.³, Peters G.S.⁴, Veligzhanin A.A.⁴

rubtsov@hydro.nsc.ru

¹ Lavrentyev Institute of Hydrodynamics SB RAS, Novosibirsk, Russia

² Novosibirsk State University, Novosibirsk, Russia

³ Borekov Institute of Catalysis SB RAS, Novosibirsk, Russia

⁴ National Research Center "Kurchatov Institute", Moscow, Russia

Nowadays nanodiamonds is widely used in a lot of different areas and its synthesis is one of the necessary and actual questions. The detonation products of high explosives (HEs) with a negative oxygen balance contain a wide phase and morphological variable of carbon forms. This forms of condensed carbon in detonation products depend on the explosion conditions. So that development of the detonation methods for the synthesis of various forms of nanodiamonds is primarily motivated by their commercial and advanced applications. Presently, registration of small-angle x-ray scattering (SAXS) signal is the only way to register experimentally the dynamics of the size of the condensed carbon nanoparticles during detonation of HEs.

This paper presents the experimental results of carbon nanodiamonds synthesis during the detonation of composition TNT/RDX (50/50) and analysis of its saved products.

In this work we used different methods: dynamics registration of SAXS signal during the detonation, static registration of SAXS, high resolution transmission electron microscopy and x-ray diffraction of the recovered carbonaceous residue (soot) of this high explosive.

Comparison and complex analysis of all these methods allowed us to modernize dynamic method for registration formation of nanodiamonds during the explosion.

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