

Structural heterogeneity of detonation diamond-containing material

Anatoly Korets¹, Alexandr Krylov², & Evgeny Mironov³

¹ Siberian Federal University; 26 Kirensky str. Krasnoyarsk 660074 Russia, korets1947@rambler.ru

² Institute of Physics, SB RAS; Akademgorodok; Krasnoyarsk 660036 Russia

³ Krasnoyarsk Institute of Railway Transport, 89 Ketshoveli str., 660028 Krasnoyarsk, Russia; ondatra2@yahoo.com

Synthesis of diamond-containing material (DCM) by means of detonation proceeds under non-equilibrium physical and chemical conditions. The assumption about significant influence of density fluctuations on the synthesis of this material is likely to be related to the several positions. First, scattering of the main material characteristics should be observed for this material. Second, structural heterogeneity for the particles implies constancy of the non-diamond part and appearance of the density contrast. Third, the difference between the equilibrium thermodynamics describing the diamond phase formation and the synthesis should be observed. The first position had been already examined. The goal of this work is to study the structural heterogeneity and composition of the centrifugation fractions. Detonation diamond-containing material synthesized by detonation in the different preservation mediums were separated into fractions. Raman and infrared spectra (IR) and X-ray diffraction patterns (XRD) of the individual fractions were measured. The particles of this material were characterized by the variable ratio of the diamond sp³ and non-diamond components. It means the irregular density distribution for this material. The distribution of sp³ grains in the particles was of complicated character. The fine DCM particles contained insignificant amount of diamond [1].

1. A.Ya. Korets, A.S. Krylov, E.V. Mironov, Proceed. XXV International Conference on Equations of State for Matter, Elbrus, Russia, 2010.