NANODIAMON DGRAPHITIZATION AT HEATING AND IRRADIATION

Zakatilova E.I.,* Efremov V.P.

JIHT RAS, Moscow, Russia
**ei.zakatilova@mail.ru*

Nanodiamonds are an interesting physical object and attractive material for many industrial applications. At industrial conditions nanodiamonds are obtained as detonation product. The sizes of detonation nanodiamonds depend on conditions of explosion. At explosion in inert atmosphere the products consist of nanodiamonds. At explosion in water environment the products are microdiamonds.

In this work the graphitization and thermal stability of detonation nano and microdiamonds were studied. Received data showed that the temperature of graphitization of nanodiamond particles lies in wide range and the temperature of graphitization beginning depend on the particle size. It is shown the high thermal stability of microdiamonds. It is established the influence of heating rate on the size of nanodiamond conglomerates.

The analysis of literature shows that the graphitization processes take place at irradiation. Depending on the type and irradiation dose the point defects, amorphous and graphite phases can form in the diamond structure. Annealing of irradiation samples showed the defect structure restore to ideal lattice and the release of stored energy.

With the appearance of powerful laboratory radiation sources (femtosecond laser), the possibility to receive nanodiamonds by irradiation of carbon media was appearance. Today this possibility determines the high interest to thermophysical properties of nanodiamond.