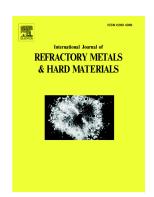
## Accepted Manuscript

Consolidation of nanocrystals of detonation diamonds at highpressure high-temperature sintering

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## ACCEPTED MANUSCRIPT

Consolidation of nanocrystals of detonation diamonds at high-pressure high-

temperature sintering

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Abstract

The process of consolidation of nanocrystals of detonation nanodiamond (DND) into

polycrystalline aggregates during their annealing at high pressures and temperatures (HPHT) was

studied. The experiments on HPHT annealing of DND powder were carried out using a high

pressure apparatus BARS at 5 GPa and 1100, 1200 °C. It was established that after HPHT

annealing the microhardness of sintered DND samples had a value of 14 GPa. It was proposed

that HPHT annealing of DNDs leads to deep purification of nanoparticle surface, resulting in

formation of strong nanodiamond polycrystalline aggregates. The observed growth can be a

result of interaction of neighboring DND nanocrystals along the contact areas that are purified of

impurities during the HPHT annealing.

**Keywords:** nanodiamond; high pressure high temperature; superhard materials

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