Lonsdeylite Influence on Nanodiamond Sintering

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We have fulfilled the complex physic-chemical properties research of nanodiamonds that were obtained using different technologies. The sintering of powders was researched in the diamond thermodynamic stability area with different bonds, with addition of static synthesis diamond and without them. The nanodiamonds sintering was carried out in toroidal high-pressure cell (we have used the hydraulic press to obtain high pressure). The following properties were researched: phase composition, additions, specific surface, particles shape and size, density. Nanodiamonds obtained using different technologies differed in their physic-chemical properties, so we have generated methods to produce diamond sinters with high physic-mechanical properties. In this research we have developed a new method of lonsdeylite quantity determination in dynamic synthesis diamond powders. In our experiments we have found that the diamond sinter density rises as the pressure increase. We have established the optimal P-T parameter for each sample differing with lonsdeylite concentration to purchase maximum sinter density in toroidal high-pressure cell. It was also determined that sinters density rises with the increase of lonsdeylite content. It was explained not only by the porosity decrease with the rise of pressure but also by increase of diamond bonds share in the sample. It corresponds with results of X-ray phase analysis and Raman spectroscopy analysis of the sinters. Sintered nanodiamonds are suitable for tools and composites production.