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Detection and identification of nitrogen centers in nanodiamond: EPR studies

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Abstract

Electron paramagnetic resonance (EPR) and electron spin echo (ESE) at X-band and at high-frequency W-band (95 GHz) have been used to study natural diamond nanocrystals, detonation nanodiamond (ND) with a size of ~ 4.5 nm and detonation ND after high-temperature, high-pressure sintering with a size of ~ 8.5 nm. Isolated nitrogen centers N 0 and nitrogen pairs N2+ have been detected and identified, and their structure has been unambiguously determined by means of the high frequency EPR and ESE in natural diamond nanocrystals. In detonation ND and detonation ND after sintering, isolated nitrogen centers N 0 have been discovered in nanodiamond core. In addition EPR signals of multivacancy centers with spin 3/2 seem to be observed in nanodiamond core of detonation ND. Copyright © Taylor & Francis Group, LLC.

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Keywords

EPR, ESE, Nanodiamond, Nitrogen