

Abstract Submitted
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Correlation between plasma OES and properties of B-doped polycrystalline diamond films¹ ALEXANDER PAL, MAXIM BELOUSOV, VIKTOR KRIVCHENKO, PAVEL MINAKOV, ALEXANDER RAKHIMOV, NIKOLAY SUETIN, VASILY SEN' — Boron is effective ligand creating p-type conductivity in diamond. If diamond film has been created by MWPECVD, the doping process can be realized by adding B-contained substance to the working mixture. At the same time morphology and doping level in many respects depend on processes occurring in MW plasma during film growth. These processes may be controlled by in-situ diagnostics of optical emission spectra (OES) of plasma. In this work we in-situ investigated OES of MW plasma in the region from 200 to 800 nm during B-doped polycrystalline diamond films (PDF) growth. Special attention was given to analysis of intensity of 249.7 nm line corresponding to 3s-2p transition of B atom. Relative intensity of this line allowed to measure amount of B in plasma. Hydrogen combined with ethanol and additives of trimethylborate was used as gas working mixture. All samples were grown on Si substrate (100) orientation. The morphology and B doping level of grown films were investigated by Raman spectroscopy using 532 nm laser radiation with power of 40 mW. Correlation dependences between OES features and Raman spectra along with temperature estimation of MW plasma were defined.

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Alexander Pal

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