

SINGLE-CRYSTAL CVD DIAMOND GROWTH IN AC GLOW DISCHARGE PLASMA *

S.A. LINNIK¹, S.P. ZENKIN¹, A.V. GAYDAYCHUK¹, A.V. SUDARIKOV¹

¹*Tomsk Polytechnic University, Tomsk, Russian Federation*

We report the research results of single-crystal diamond CVD growing in a new PACVD reactor with alternating high-current glow discharge plasma. Hydrogen-methane and argon-hydrogen-methane gas mixtures were used as the precursor gases. We found the optimal energy range, working pressure and gas content, temperature and volt-ampere characteristics. In this CVD reactor diamond crystals can be produced at growth rates up to 100 $\mu\text{m/h}$, which is up to 2 orders of magnitude higher than standard processes for making polycrystalline MPCVD diamond. This high-quality single-crystal MPCVD diamond may find numerous applications in electronic devices as high-strength windows and in a new generation of high-pressure instruments requiring large single-crystal anvils.

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