INFLUENCE OF NITROGEN IMPURITY ON RADIATIVE AND NONRADIATIVE RECOMBINATION IN CUBIC SILICON CARBIDE

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S u m m a r y

Radiative recombination of free exitons and nonradiative recombination of electrons and holes in various pyramids of growth are studied with photoelectric and luminescence techniques. It is shown that the radiative quantum efficiency and electron stationary lifetime depend mainly on the uncontrolled content of the nitrogen impurity. The inhomogeneous distribution of nitrogen over various pyramids of growth is found by the method of electron paramagnetic resonance (EPR). Asymmetry of the EPR lineshape indicates also the presence of additional paramagnetic defects. A rise of the nitrogen concentration results in an increase of the luminescence efficiency and a decrease of the electron lifetime in accordance with theoretical calculations. Furthermore, the degree of crystal perfection influences the luminescence quantum efficiency and lifetime of electrons.