N4-O-011102

EDGE CATHODOLUMINESCENCE IN DIAMOND IN TEMPERATURE RANGE FROM 70 TO 500 K*

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Paper deals with the spectral study of the radiative recombination of free excitons in synthetic diamonds, irradiated by a beam of charged particles (electrons) in a temperature range from 70 to 500 K. This method of treatment is an example of nondestructive inspection technique of the crystal structure perfection of a synthetic sample. In addition, diamond, having a strong exciton cathodoluminescence, is a promising material for using it as a luminophore in a cathodoluminescent emitter.

There are relatively few works devoted to the study of diamond luminescence at elevated temperature. For example, authors of [1, 2] studied the glow of diamond samples at elevated temperatures with electroluminescence. In [3, 4] the temperature dependences of the cathodoluminescence peaks of free excitons in CVD diamonds was investigated. But we didn't found data on the behavior of luminescence at temperatures above 300 K.

In our work we used HTHP diamond samples for luminescence investigations. Figure 1 shows non typical dependence of exciton peak intensity at 235 nm from temperature.

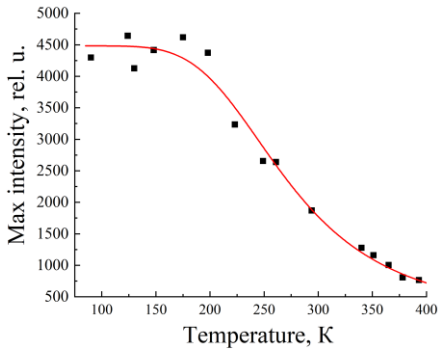

Fig.1. Dependence of excitonic peak intensity at 235 nm from temperature.

Knowledge and understanding of the behavior of exciton cathodoluminescence in diamond can become an impulse for the creation of a new type of ultraviolet emitter.

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* The work was supported by the Russian Science Foundation (Grant No. 22-22-00984).