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I-10

CHANGES IN THE EXCITON CATHODOLUMINESCENCE SPECTRA OF DIAMOND AT ELEVATED TEMPERATURES

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The study of exciton cathodoluminescence in diamond is not only scientific but also practical importance. Ultraviolet radiation at a wavelength of 235 nm can be used for disinfection, activation of surface reactions, photochemistry, and more. Thus, diamond is a promising material for creating a cathodoluminescent source of ultraviolet radiation.

We have investigated the temperature dependences of the exciton cathodoluminescence spectra of single-crystal diamond in the temperature range from 80 to 400 K. The temperature dependences showed a characteristic increase in the intensity of exciton cathodoluminescence in the range 230–240 nm with increasing temperatures from 80 to 150–180 K. Further increase in temperature to room temperature (297 K) leads to a twofold decrease in the radiation intensity. With a further increase in temperature to 400 K, no change in the cathodoluminescence intensity was observed within the error.

The study was carried out on the state order of the Ministry of Education and Science of Russia, Project No. 0721-2020-0048.

I-11

PROTOTYPE OF A DIAMOND BASED UV SOURCE AS AN EMITTER

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The report deals with the results of a study of the exciton cathodoluminescence of diamond, as well as the creation of a prototype of a cathodoluminescent ultraviolet source based on it.

In our previous work [1], optical studies of cathodoluminescence of 5 different samples were carried out. It was found that a C12 diamond single crystal sample synthesized by the HPHT (high pressure high temperature) method has a strong radiative recombination band of free excitons at 235.2 nm. Such a sample is promising for its use as an ultraviolet emitter.

The paper presents the results of spectrometric studies of cathodoluminescence of a diamond sample in the ultraviolet region. Life tests of the emitter were carried out, and a prototype of an ultraviolet emitter was presented.

The studies were performed in the framework of the State Task for IHCE SB RAS, Project No. FWRM-2021-0014.

1. *Ripenko V., Genin D., Burachenko A., Shulepov M., Artyomov K., Eliseev A., Vins V., and Lipatov E.* Change of cathodoluminescence spectra of HTHP dimonds irradiated by electron beam in visible-UV region // 7th International Congress on Energy Fluxes and Radiation Effects (EFRE). 2020.

I-12

SOLAR WIND DETECTOR BASED ON CHERENKOV RADIATION IN DIAMOND

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