

DIAMOND SCINTILLATOR FOR SYNCHROTRON X-RAY BEAM MONITOR*

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Synthetic diamond, due to its unique properties, is widely used in various fields of science and technology. In addition, diamond has a large number of color centers, one of the most common of which is the NV⁰ center. To create crystals with such centers, synthetic diamonds grown by the temperature gradient method with a high content of substitutive nitrogen admixture are usually used. Such crystals are subjected to radiation heat treatment to create the necessary color centers [1]. Diamonds with a high content of NV centers are excellent indicators of various kinds of impact.

In this work, a number of diamond samples containing NV⁰ centers were studied. Figure 1 shows a photograph of the glow of a similar sample under the action of a synchrotron beam (a), the X-ray luminescence spectrum (b) and the calculation of the synchrotron beam imprint on a diamond crystal (c).

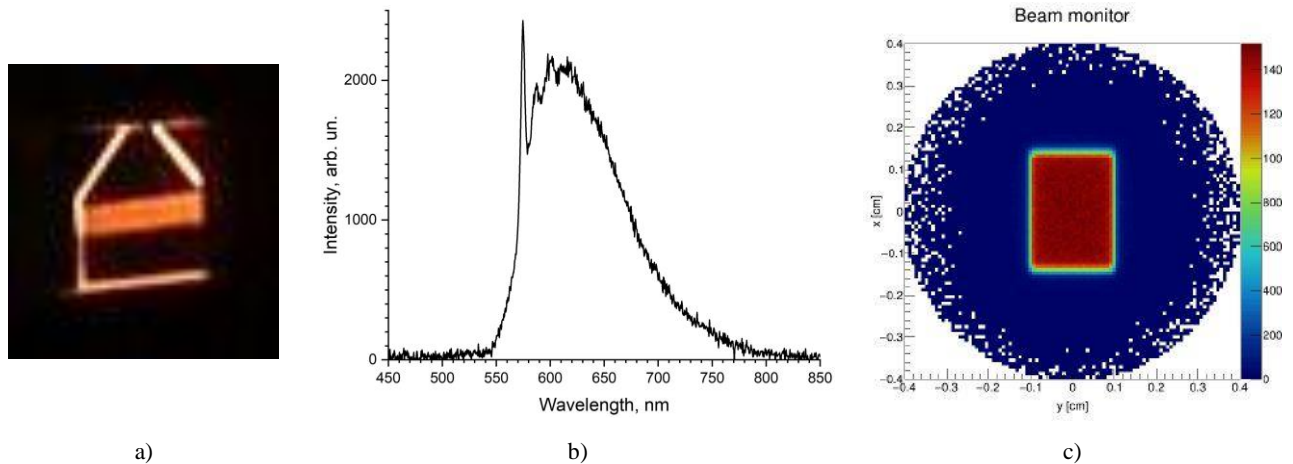


Fig.1. a) The glow of NV⁰ centers in a diamond sample under the action of X-ray beam of VEPP-3/4 setup, b) the spectrum of X-ray luminescence of NV⁰ centers in a diamond sample, c) the calculated area of X-ray luminescence of synchrotron beam of SKIF setup on the surface of a diamond sample with NV⁰ centers

This report is devoted to the results of research and calculations of diamond crystals for the task of creating an X-ray beam monitor scintillator.

REFERENCES

- [1] I. A. Dobrinets, V. G. Vins, A. M. Zaitsev, "HPHT-Treated Diamonds", Springer Series in Materials Science, 181, p.1-270, 2013

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