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F-11

INFLUENCE OF POST-POST PROCESSING TECHNOLOGY AND LASER RADIATION PARAMETERS ON THE OPTICAL BREAKDOWN THRESHOLD OF A $ZNGEP_2$ SINGLE CRYSTAL

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The aim of this work is to determine the influence of the parameters of post-growth technological operations and experimental conditions on the threshold of optical breakdown of the surface of ZGP crystals under the action of laser radiation at a wavelength of 2091 nm.

The conducted studies revealed a number of parameters of ZGP single crystals, their post-growth processing, as well as the affected radiation, which have the strongest influence on the breakdown threshold. It is established that thermal annealing of ZGP and irradiation with a fast electron flux do not lead to an increase in the Breakdown threshold at a wavelength of 2091 nm. It is shown that the influence of the ZGP surface polishing quality on the optical breakdown threshold is most determined by the PV parameter. The dependence of the breakdown threshold at the wavelength of 2091 nm on the crystal temperature (varying from 24 to 1060 °C) is found. When the temperature decreases from 0 to 6000 °C, a sharp increase in the breakdown threshold is observed (by 1.5 and 3 times). The increase in the breakdown threshold with a decrease in the ZGP temperature can be explained by the temperature dependence of the fill numbers of phonons that take part in the indirect valence band – impurity level transitions together with optical quanta.

F-12

TEMPERATURE DEPENDENCE OPTICAL PROPERTIES OF KTP CRYSTALS IN THE MILLIMETER WAVELENGTH RANGE

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Currently, one of the promising areas of terahertz (THz) photonics is high intensity mobile sources of THz radiation. The development of such devices will make it possible to approach the creation of a compact terahertz lidar for efficient monitoring of the environment due to the absence of THz radiation scattering by aerosols.

Nonlinear crystals of potassium titanyl phosphate $KTiOPO_4$ (KTP) can be promising converters of laser radiation frequencies into millimeter waves. Previously, the optical terahertz properties of KTP crystals were investigated and the possibility of down conversion of laser radiation in them was shown [1–2]. The aim of this work is a more detailed study of the terahertz properties of KTP crystals in the range of 0.2 ÷ 1 THz (1.5 ÷ 0.15 mm) in a wide temperature range (–195 °C ÷ +150 °C).

On a pulsed terahertz spectrometer in a focused beam using two film polarizers, the THz optical properties of two high resistance (~ 10^{10} Ohm^{-1} cm^{-1}) samples of the KTP crystal in the form of polished plane parallel plates 10Ч10Ч3 mm in size, oriented along the optical axes were studied. The