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ABSTRACTS

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DIGITAL HOLOGRAPHY METHODS FOR VISUALIZATION AND IDENTIFICATION OF $ZnGeP_2$ BULK DEFECTS

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The volumetric filamentous inclusions in $ZnGeP_2$ were visualized by digital holography, their characteristic sizes were determined, and their location in the sample volume was determined. The chemical composition of filamentous bulk inclusions – Zn_3P_2 and Ge-was determined by X-ray diffraction analysis. The influence of the second-phase inclusions (Zn_3P_2 and Ge) on the quasi optical characteristics (refractive index and absorption coefficient) in the resonant absorption band (12–12.5 microns) is established. The presence of bulk inclusions in the $ZnGeP_2$ single crystal leads to an increase in the reflection coefficient in the region of 12.5 microns. The dispersion dependences of the refractive index and the absorption coefficient of the studied $ZnGeP_2$ samples at wavelengths of 300–1000 microns in the non fundamental absorption region were obtained. The obtained experimental results confirm the assumption of the determining role of free carriers in the formation of dielectric losses in the wavelength range of 100–1000 microns. The hypothesis that one of the main sources of free carriers in $ZnGeP_2$ is the matrix medium / inclusion interface of the second phase is confirmed.

F-24

SPATIAL DISTRIBUTION OF THE STORED LIGHT SUM OF FEMTOSECOND LASER RADIATION IN LiF:Mg,Ti

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The aim of our work was investigation of the mechanism of light sum storage in LiF:Mg,Ti crystals under action of intense femtosecond radiation of a titanium sapphire laser in the near- IR region of ~ 800 nm, as well as study of the photoluminescence of irradiated samples in comparison with the results of studies of thermally stimulated luminescence (TSL) of the same crystals irradiated by beta radiation and other types of radiation. The object of our research was dosimetric LiF:Mg (100 ppm), Ti (10 ppm) monocrystals widely used in gamma dosimetry.

The experimental setup for irradiating of LiF:Mg,Ti crystals with femtosecond laser pulses included a titanium sapphire laser generating pulses of 50 fs duration with an energy of about 6 mJ and a repetition rate of 10 Hz. A specialized installation was used to carry out TSL studies in the temperature range from 295 to 673 K with a constant heating rate of 1 Ks^{-1}. After measuring the thermal emission curves of the crystal irradiated with femtosecond radiation, we conducted additional TSL studies of the same sample irradiated with β-radiation from the ^{90}Sr-^{90}It isotope source with a dose rate of 0.6 Gy/min. The sample was irradiated by beta particles for 30 seconds.

The results of thermoluminescence studies show that in case of femtosecond irradiation, the peaks caused by annealing of F_2 and F_3^+ color centers are observed in the thermal illumination curve along with the main dosimetric peak of TSL with a maximum of 485 K. High temperature peaks after