

Corderoite-type nanomaterials for optoelectronic applications

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The remarkable progress was achieved in the study of the physical and chemical properties of $\text{Hg}_3\text{X}_2\text{Y}_2$ (X= S, Se, Te; Y= F, Cl, Br, I) crystals. Their optical properties such as high refractive index, photoconductivity, electrooptical effect, optical activity, optical nonlinearity etc., make them promising nanomaterials for nonlinear application. From the structural point of view, the corderoite family crystals are well ordered, and observed that the basic structural unit is a $[\text{XHg}_3]$ pyramid. The crystal structure consists of two sets of octahedral spirals with different radii and twisting directions. These crystals possess an excellent transparency in the mid-IR spectral range. Due to these features, the mentioned crystals in nanoparticle form have a wide range of optical applications in nanophysics. Obtained data suggest that the optical properties of the titled crystals should be taken into account in the studies concerning optical diagnostic methods in medicine. At the same time due to the transparency of corderoite family compounds in the wide region of the visible and IR-range (from 0.3 to 40 μm) creates new opportunities for materials design. They have a great potential for wide range of possible application in optical devices: elements for dynamic holography, recording and information storage, modulators, deflectors and other devices based on the phenomenon of the interaction of light beams.

Topics

Session C. Applied optics and engineering

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