

Brief information about the project

Name of the project	AP19575956 «Crystal chemistry and optical properties of functional ytterbium orthoborates»
Relevance	Within the framework of the project, it is planned to refine the phase diagrams of systems containing ytterbium: YbBO ₃ – AlBO ₃ , YbBO ₃ – GaBO ₃ , YbBO ₃ – ScBO ₃ , YbAl ₃ (BO ₃) ₄ – YbSc ₃ (BO ₃) ₄ , YbAl ₃ (BO ₃) ₄ – YbGa ₃ (BO ₃) ₄ with an emphasis on a detailed study of the homogeneity of Yb(Al,Ga,Sc) ₃ (BO ₃) ₄ compounds by solid-phase synthesis and diffusion experiments, as well as to characterize the composition, structure and luminescent properties of the obtained compounds. To clarify the crystal structure, determine structural features and conduct experiments to evaluate nonlinear optical properties, crystals of the studied samples will be synthesized using the method of spontaneous crystallization from solvents.
Purpose	Identification of interrelations between the chemical composition, atomic structure, and physical properties of Yb orthoborate crystals, isostructured to the huntite mineral, for their use as sources of laser radiation, nonlinear optical and luminescent materials.
Objectives	<p>Objective 1. Determine the width of the homogeneity region of compounds in the systems YbBO₃ – AlBO₃, YbBO₃ – GaBO₃, YbBO₃ – ScBO₃, YbAl₃(BO₃)₄ – YbSc₃(BO₃)₄, YbAl₃(BO₃)₄ – YbGa₃(BO₃)₄.</p> <p>Objective 2. Evaluate the effect of redistribution of cations in the sites of the crystal lattice of the studied solid solutions on the optical properties of materials.</p> <p>Objective 3. Purposeful synthesis of crystals of functional Yb orthoborates of the required composition for use in photonics.</p>
Expected and achieved results	<p>1. Information will be obtained on the boundaries of the regions of homogeneity of the extreme members and intermediate compounds in the sections of the YbBO₃-AlBO₃, YbBO₃-GaBO₃, YbBO₃-ScBO₃, YbAl₃(BO₃)₄-YbSc₃(BO₃)₄, YbAl₃(BO₃)₄-YbGa₃(BO₃)₄ systems.</p> <p>2. The regularities between the chemical composition, crystal structure and optical properties of the studied compounds will be established.</p> <p>3. Scientific and methodological foundations for the production of Yb (Al,Ga,Sc)₃(BO₃)₄ crystals of controlled composition for applied applications will be developed.</p>
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<p>List of publications with links to them</p>	<p>-</p>
<p>Patents</p>	<p>-</p>

