THE SPECTRAL-GENERATION PROPERTIES OF CRYSTAL $Sr_4B_{14}O_{25}$:Pr^{3+}

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S u m m a r y

The absorption and luminescence spectra of a new $Sr_4B_{14}O_{25}$ crystal doped with Pr^{3+} are investigated. Within the method of minimal deviation, the dispersion of refractive indices of $Sr_4B_{14}O_{25}$:Pr^{3+} crystal is measured. The coefficients of the Sellmeier equation are calculated. With the experimental absorption results, the Jadd — Offelt intensity parameters of new crystal $Sr_4B_{14}O_{25}$:Pr^{3+} are calculated: $\theta_2 = 1.114 \cdot 10^{-19}$ см^2, $\theta_4 = 1.388 \cdot 10^{-20}$см^2, $\theta_6 = 1.815 \cdot 10^{-20}$ cm^2. We calculated the spontaneous transition probabilities and generation cross section. The lifetime of the metastable energy level $^3P_0$ $t_{\text{calc}} = 22$ μs is in good agreement with the experiment $t_{\text{exp}} = 17$ μs. The analysis of the theoretical results indicates a possibility of laser generation in a visible range at the wavelength $\lambda = 655$ nm (the transition $^3P_0 - {}^3F_2$) in crystal $Sr_4B_{14}O_{25}$:Pr^{3+} at room temperature.