

A study of optical properties of Sm^{3+} ions in $\alpha\text{-Na}_3\text{Y}(\text{VO}_4)_2$ single crystals.

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Streszczenie

Single crystals of $\alpha\text{-Sm}^{3+}\text{:Na}_3\text{Y}(\text{VO}_4)_2$ have been grown by the flux growth method. The absorption (300 K) fluorescence (4.2 and 300 K) and excitation (7 and 300 K) spectra as well as the fluorescence dynamics of the Sm^{3+} -doped title crystals are presented and analyzed in detail. The energy transfer between $\text{Sm}^{3+}\text{-Sm}^{3+}$ as well as from VO_4^{3-} to Sm^{3+} were studied in detail. A Judd–Ofelt intensity analysis of the absorption (300 K) spectrum has been applied for determination of Ω_λ parameters which in turn have been used in calculation of the radiative transition probability factor (A), fluorescence branching ratios (β), natural (radiative) lifetime of the $^4\text{G}(4)_{5/2}$ level of Sm^{3+} and emission cross-section (σ_{em}). For the first time very large lifetimes of the Sm^{3+} fluorescence level have been observed.

Słowa kluczowe

Samarium Sm^{3+} , Vanadates, luminescence, energy transfer, Crystals, Vibronic transitions

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