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Spectral-kinetic and photochemical properties of Ce³⁺:Na₄Y_{6-x}Yb_xF₂₂ single crystals

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Abstract

The spectral-kinetic characteristics of Ce³⁺ ions doped Na₄Y_{6-x}Yb_xF₂₂ (x=0-0.05) single crystals were studied. Ce³⁺ ions 5d-4f interconfigurational fluorescence quantum yield versus Yb³⁺ ion codopant concentration was measured. Pump-induced color center absorption spectra were studied and the efficiency of Yb³⁺ ions codoping antisolarant crystal-chemical technique applied to Na₄Y₆F₂₂:Ce³⁺ was demonstrated. The optimal Yb³⁺ ions content from the point of view of effective tunable laser action was estimated. The obtained results allow proposing Na₄Y_{6-x}Yb_xF₂₂ as a new prospective photochemically stabilized material for UV/VUV application.

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Keywords

5d-4f interconfigurational transition, Antisolarant technique, Color center, UV laser action