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Investigation of gain characteristics in mixed crystals LiMeF₄ (Me = Y, Lu, Yb) doped by Ce³⁺ ions

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Abstract

Differential gain spectra in the range 295-335 nm were measured in crystals of scheelite structure LiY_{1-x}Lu_xF₄ (x = 0-1), doped by Ce³⁺ ions. It is shown that variation of Lu³⁺ and Y³⁺ ions relative content in LiY_{1-x}Lu_xF₄ crystals allows to manipulate the spectral width of the amplification band. Cross-sections of excited-state absorption at the wavelengths of Ce³⁺ luminescence, probability ratios of formation and thermal destruction of color centers depending on the Y³⁺ ions content in LiY_{1-x}Lu_xF₄ crystals were estimated. Even better gain characteristics have been demonstrated by LiLuF₄:Ce³⁺, doped by Yb³⁺ ions. The highest optical gain coefficient with a wide amplification band among studied samples was observed in LiLuF₄:Ce³⁺ crystal, codoped by Yb³⁺ ions. © 2014 Pleiades Publishing, Ltd.

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