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Enhanced efficiency ultraviolet LiYXLu_{1-x}XF₄:RE³⁺ (RE = Ce, Yb) laser

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Abstract

© 2014 Astro Ltd. We report the results of laser tests in LiYXLu_{1-x}XF₄:RE³⁺ (RE = Ce, Yb; x = 0, 0.3) crystals and the effect on laser characteristics (slope efficiency and tuning range) of such variations of the lasing conditions as the pumping repetition rate, temperature and additional illumination of the active element. It was established that slope efficiency increases and the tuning range of ultraviolet lasing widens and becomes continuous when the crystal is cooled down below 0 °C, or exposed to 532 nm radiation. 266 and 340 nm illumination reduces or completely quenches laser oscillation. The photodynamic processes underlying these effects, such as excited-state absorption and formation/destruction of color centers, are discussed.

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Keywords

color centers, excited-state absorption, fluoride crystals, mixed crystals, photodynamic processes, rare earth ions, UV laser