

Tunable yellow-green up-conversion emission and luminescence lifetimes in Yb³⁺-Er³⁺-Ho³⁺ multi-doped β-NaLuF₄ crystals.

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This paper reports the spectroscopic properties of up-converting NaLuF₄ materials doped with Yb³⁺, Er³⁺ and with different amount of Ho³⁺ ions. The products were synthesized by simple hydrothermal route and their structural properties were carefully examined by using X-ray diffraction and scanning electron microscopy. The relation between the changing amount of Ho³⁺ ions and spectroscopic properties was investigated by luminescence measurements. The recorded emission spectra exhibited seven characteristic bands under excitation with 975nm laser beam, with the most intense peaks at 550 and 650nm. The observed in the emission spectra peaks resulted from overlapped emission of Er³⁺ and Ho³⁺ ions. The dependencies between laser power density and integral luminescence intensity were measured. Determined on their basis number of photons responsible for the observed up-conversion and calculated luminescence lifetimes allowed determining the mechanism of the up-conversion process, in detail.

Słowa kluczowe

Up-conversion luminescence, Interionic energy transfer, Luminescent materials, Rare earth ions, Lifetimes: rise and decay times

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