

Upconversion luminescence from Er³⁺ in nanocrystalline Y₂Si₂O₇:Er³⁺ and Y₂Si₂O₇:Yb³⁺, Er³⁺ phosphors.

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Nanocrystalline yttrium pyrosilicate Y₂Si₂O₇ (YPS) doped with Er³⁺(YPS:Er) or Yb³⁺/Er³⁺(YPS:Yb,Er) was obtained by the reaction of nanostructured Y₂O₃ and colloidal SiO₂. X-ray diffraction analysis confirmed the crystallization of a single phase of α-YPS at 1150 °C and β-YPS at 1250 °C. The luminescence and upconversion spectra of Yb³⁺/Er³⁺ codoped phosphors are reported. After direct excitation at 488 nm the samples emitted mostly green radiation. Excitation at 980 nm produced green and red upconversion luminescence both from Er³⁺ doped and Yb³⁺ co-doped samples. Using 804 nm wavelength the green and red upconversion luminescences were observed for Yb³⁺ co-doped samples while Er³⁺ doped samples emitted exclusively in the green region. It was found that the Er³⁺ upconversion luminescence is more intense in β-YPS than in α-YPS. The dependence of upconversion luminescence intensity on the excitation power allows upconversion mechanisms for the investigated samples to be proposed.

Słowa kluczowe

Nanocrystalline Y₂Si₂O₇, Upconversion luminescence, Er³⁺, Yb³⁺

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