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The luminescent properties of a $ZnGa_2O_4$ spinel doped with Eu^{3+} and Er^{3+} ions

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Abstract

Nanophosphor of $ZnGa_2O_4:Eu^{3+}$ and Er^{3+} were synthesized by the hydrothermal method. $ZnGa_2O_4$ is an intrinsic blue light emitter with a wavelength peak of approximately 608 nm depending on the gallium ratio. A luminescent analysis of the materials shows that the rare earth ions are localized in the defect sites at the crystallite boundaries. The emission spectra of the europium-doped samples are characterized by an intense emission in the red region due to the $^5Do^{-7}F_{1,\ 2}$ transitions of Eu^{3+} ions, whereas in the case of erbium doping the highest intensity corresponds to the green light emission due to the $^4I_{13/2}–^4I_{15/2}$ transitions of the Er^{3+} ions. These powders were analyzed by x-ray diffraction (XDR) and characterized by scanning electron microscopy (SEM), energy dispersive spectroscopy (EDAX) and atomic force microscopy (AFM). Photoluminescence (PL) and

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photoluminescence excitation (PLE) measurements were made with a conventional lamp as an excitation source.