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Synthesis and Photoluminescence properties of $\text{Sr}_{0.95}\text{Ba}_{0.05}\text{La}_{2-x}\text{O}_4:\text{xRE}^{3+}$ (RE=Eu,Er,Ce and Ho) for WLEDs application

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Abstract

The $\text{Sr}_{0.95}\text{Ba}_{0.05}\text{La}_{2-x}\text{O}_4:\text{xRE}^{3+}$ (RE=Eu,Er,Ce and Ho) phosphors are synthesized through high temperature solid-state reaction method at steps of 1000, 1100, 1200°C. The impact of temperature on phase structures, functional group, luminescence properties and decay lifetime are investigated. The prepared $\text{Sr}_{0.95}\text{Ba}_{0.05}\text{La}_{2-x}\text{O}_4$ phosphors exhibit abundant luminescent properties with doping of different RE^{3+} ions under ultraviolet-visible and infrared excitation (980 nm) excitation. The $\text{Sr}_{0.95}\text{Ba}_{0.05}\text{La}_{2-x}\text{O}_4:\text{xEr}^{3+}$ particles characterize red emission ($^4\text{F}_{9/2} \rightarrow ^4\text{I}_{15/2}$) through up-conversion emissions at 980 nm NIR irradiation. The chromaticity (CIE 1931) color coordinates of the titled phosphors have also been evaluated. The merits of multicolor emissions in the visible region endow the synthesized material by UV irradiation reveals potential candidate in the field of light display systems, lasers and optoelectronic devices.

Keywords

Rare earth ions; Ln^{3+} :phosphors; Photoluminescence; Upconversion; CIE coordinates

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