

Luminescence of Co-doped $(\text{Ba}_{1-x}\text{Sr}_x)\text{MgSi}_2\text{O}_6$ Phosphors by Eu^{3+} and Pr^{3+}

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Abstract

In recent years, luminescent materials with high efficiency under electron, blue visible light, and UV radiation have been drawn interest. Various types of multicomponent oxide phosphors have been widely studied for use in flat panel display technologies, especially in FED and LED and so on. In order to achieve the high luminance efficiency we have studied the co-doping effect in the $(\text{Ba}_{1-x}\text{Sr}_x)\text{MgSi}_2\text{O}_7$ Phosphors. The aim of this work is the development of green-red luminescence phosphor powder. The sample were prepared by solid state reaction method. The SrCO_3 , BaCO_3 , SiO_2 , Eu_2O_3 , Bi_2O_3 , CeO_2 , Pr_6O_{11} were used as starting materials. The solid solutions of $(\text{Ba}_{1-x}\text{Sr}_x)\text{MgSi}_2\text{O}_6: y\text{Eu}, z\text{Re}$ ($x = 0, 0.5$, $\text{Re} = \text{Pr}, \text{Ce}$) are of particular interest in green-red emission by the excitation of blue and UV ray. Firstly the starting materials were mixed according to the compositions given above. Then the mixture was calcined at $800\text{--}1000^\circ\text{C}$; in electric furnace. Secondly, the calcined powders were reacted in the temperature range of $1200\text{--}1400^\circ\text{C}$; for 2h 5h under flowing N_2/H_2 or in air. The excitation range is $324\text{--}395\text{nm}$ and the emission is about $520\text{--}620\text{nm}$. To improve the emission efficiency we modified the component ratio and calcination temperature. The emission and excitation spectra were measured with a PL spectrophotometer.