A novel blue-emitting phosphors ($CsBaYB_6O_{12}:Ce^{3+}$): Potential applications in w-LEDs and X-ray phosphors

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Abstract

We have synthesized powder samples of pure and Ce^{3+} doped cesium barium yttrium hexaborate ($CsBaYB_6O_{12}$) using a standard solid-state reaction technique. The prepared samples were characterized by different techniques. Powder X-ray diffraction (PXRD) was used to identify the phase purity of the prepared phosphors. The field emission scanning electron microscopy (FE-SEM) technique was used to examine the size and shape of the synthesized powder samples. The energy-dispersive spectral analysis (EDS) was used to identify the elements present in the synthesized compounds. X-ray-induced luminescence spectra, photoluminescence (PL), and thermoluminescence (TL) analysis were used to investigate the luminescence properties of the prepared compound. The rare earth ion of Ce^{3+} improves the intrinsic luminescence of $CsBaYB_6O_{12}$ and 4 mol% was found to be the optimal concentration. The dopants found to have two different excitation PL bands at 340 nm and 360 nm which yields the same emission bands of 385 and 417 nm which are well-matched with that found in the X-ray emission bands. The kinetic parameters of the measured experimental TL glow curve has been studied by various standard methods such as deconvolution, Variable heating rate and initial rise method. In this manuscript we report the luminescence properties of the prepared phosphors in a detailed manner for the first time.

The full text can be found at the following link:

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