

## Synthesis and photoluminescent properties of Ba<sub>2</sub>V<sub>2</sub>O<sub>7</sub>:Eu phosphors

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### Abstract

A solution combustion route has been adopted for the synthesis of Eu<sup>3+</sup>-activated Ba<sub>2</sub>V<sub>2</sub>O<sub>7</sub> phosphors using carbohydrazide as an organic fuel. Structure and luminescent characteristics of Ba<sub>2</sub>V<sub>2</sub>O<sub>7</sub>:Eu<sup>3+</sup> phosphors as prepared and post heat-treated at different temperatures for 3 h have been studied by X-ray diffraction (XRD), scanning electron microscopy (SEM) and fluorescence spectrometry (PL). The incorporation of Eu<sup>3+</sup> activator in these phosphor particles has been checked by luminescence characteristics. These particles displayed excellent red color under a UV source which is due to characteristics transition of Eu<sup>3+</sup> from <sup>5</sup>D<sub>0</sub>→<sup>7</sup>F<sub>2</sub> at 613 nm ( $\lambda_{\text{ex}}=394$  nm). The excitation spectrum of the compound shows a dominant broad band, which corresponds to CT transitions from Eu<sup>3+</sup>-O<sup>2-</sup> group, the sharp peaks in the longer wavelength region are due to intrinsic excitation bands of Eu<sup>3+</sup>, the peak with maxima at ~ 394 nm (<sup>7</sup>F<sub>0</sub>→<sup>5</sup>L<sub>6</sub>) being the dominating. These materials have potential applications in optics, optoelectronics technology and advanced ceramics.

**Keywords:**-Red phosphor; Carbohydrazide; Ba<sub>2</sub>V<sub>2</sub>O<sub>7</sub>:Eu.

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