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Comparative study of luminescence properties of Eu²⁺, Dy³⁺ and Tm³⁺ co-doped CaAl₂O₄ powder phosphors

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Abstract content
   (Max 300 words)

Preparation of Eu²⁺, Dy³⁺ and Tm³⁺ ions co-doped CaAl2O4 phosphor powders by combustion method is reported. The morphology and particle size, and crystal structure of the CaAl₂O₄ host were confirmed by field emission scanning electron microscopy (FESEM) and X-ray diffractometer (XRD), respectively. Ultraviolet, visible (UV/VIS) and cathodoluminescence measurements were carried out in order to investigate the optical properties of the powder phosphors. Blue emission at 440 nm from Eu2+ excited with He-Cd laser for all systems was measured. No emission from Dy³⁺ and Tm³⁺ ions were measured. Excitation with Auger electron spectroscopy (AES) showed emission from Tm³⁺ (at 458 nm and 470 nm) and Dy³⁺ (at 571 nm and 477 nm) dominating the emission from Eu²⁺ ions. The emission intensities of the different systems were compared. Different excitation energies (wavelengths) using the spectrophotometer equipped with xenon lamp were used to excite the powders and the observed change in the shape of the emission spectra is reported.

Key words: Cathodoluminescence, Photoluminescence, Combustion, Blue emission

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