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PHOSPHORS FOR WHITE LED LAMPS

In this work, the $\text{Li}_3\text{Ba}_2\text{La}_3(\text{MoO}_4)_8:(\text{Eu}^{3+}, \text{Tb}^{3+})$ phosphor was investigated due to its excellent luminescence emission properties in the red spectral range (615–620 nm) under excitation with a blue LED (Light Emitting Diode). The phosphors were synthesized by the combustion and sol gel methods, at different Eu and Tb concentrations, in order to find the optimal luminescence conditions and nanostructural characteristics. Its physicochemical properties were studied by different analysis techniques. Subsequently, the optimized red material was mixed with a commercial $\text{YAG}:\text{Ce}^{3+}$ phosphor at different concentrations to obtain white light. Then, a white light lamp was manufactured using a commercial blue LED as the excitation source for the combined luminescent powders. Finally, the emission spectra and the Color Rendering Index (CRI) of the lamp were reported. The proposed phosphor is a promising candidate for its application as a red-emitting component in lighting systems based on solid-state devices, particularly blue LEDs.

Keywords

europium, terbium, energy transfer, LED

Reference

1. Böhnisch, D., Baur, F., and Jüstel, T. (2017). "Photoluminescence and energy transfer behavior of narrow band red light emitting $\text{Li}_3\text{Ba}_2\text{Tb}_3(\text{MoO}_4)_8:\text{Eu}^{3+}$ ". Dalton Transactions, 47(5), 1520–1529.

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