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## LUMINESCENCE PROPERTIES OF CORDIERITE RED-EMITTING PHOSPHOR PREPARED BY COMBUSTION SYNTHESIS FOR APPLICATIONS IN WHITE-LIGHT ILLUMINATION LEDS

There is a need to develop composite phosphors for white-emitting lamps based on blue LEDs that can be efficiently activated and generate light with high color rendering index (CRI). In particular, there are only few red-emitting luminescent materials excited with blue photons for CRI improvement of the illumination devices. In this investigation, we report a two-stage energy-efficient methodology to fabricate Eu-doped  $\alpha$ -cordierite red-emitting phosphors. The first stage of the process consists in the preparation of a spinel-phase ( $\text{MgAl}_2\text{O}_4$ ) and  $\text{SiO}_2$  mixture by using low-temperature combustion synthesis. Post-annealing treatment at  $1350^\circ\text{C}$  for just 1 hour in a reducing atmosphere is employed as the second stage to obtain  $\alpha$ - $\text{Mg}_2\text{Al}_4\text{Si}_5\text{O}_{18}:\text{Eu}^{2+}$ . When blue light (465 nm) was used as the excitation source the cordierite phosphor powders yielded a broad red emission peak centered around 617 nm making this material a robust red-emitting phosphor and a potential candidate for integration with YAG:Ce to improve CRI in white-emitting LED lamps. On the other hand, the photoluminescence spectrum of  $\alpha$ - $\text{Mg}_2\text{Al}_4\text{Si}_5\text{O}_{18}:\text{Eu}^{2+}$  displayed a broad blue emission band peaking at 465-488 nm under UV (365 nm) excitation.

### Keywords

Red-emitting phosphor, combustion synthesis, cordierite, LED, illumination

### Reference

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### Author approval

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### Author will attend

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