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Influence of varying Cr³⁺ mol% in MgAl₂O₄:0.1% Eu³⁺, x% Cr³⁺ nanophosphor synthesized by sol-gel process

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The XRD data revealed that all annealed samples consist of the pure cubic MgAl₂O₄ structure. The estimated crystallites size were in the range of 12.1 – 11.0 nm in diameter. SEM results showed that the dopant type and varying the Cr³⁺ concentration in the co-activated samples influences the surface morphology of the phosphor. The PL results showed that the host, 0.1% Cr³⁺ and Eu³⁺ activated nanophosphor emits at different wavelengths. Emission peak at 390 nm is attributed to the band-gap defects in the host material. Emission at 405 is attributed to arise from both the contribution from the host and Cr³⁺ (4T₁ → 4A₂ transition) emissions. The green emission peak at 565 nm is attributed to arise from either the host or Cr³⁺ (4T₂ → 4A₂ transition). An emission peak at 574 nm is attributed to the well-known orange emission from 5D₀ → 7F₁ transition in Eu³⁺ ion, while the emission peak at 619 nm is assigned to the Eu³⁺ electric dipole from 5D₀ → 7F₂ transition. An emission at 694 nm is attributed to the Cr³⁺ from 2E → 4A₂ transition. Co-activating the host with Cr³⁺ ion quenches the host emission at 390 nm. The CIE color coordinates (see Fig. 2) shows that the emission color can be turned by varying the co-activator concentration.

Are you currently a postgraduate student? (Yes/No)

Yes

At what level of studies are you currently? (Hons/MSc/PhD)

PhD

Please provide the name and email address of your supervisor.

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