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Structural and photoluminescent properties of Y2O3, Y2O3-AG: Eu3+ (where AG = PO42-, SO42-, BO33-) nanophosphors for white-LED applications

This work reports on the structural and photoluminescence properties of Y2O3, Y2O3-AG: Eu3+ where AG = PO42-, SO42-, BO33-) nanophosphors synthesized via the chemical combustion method, annealed at 1100oC temperature for 4 hr. The crystal formation and the morphological behaviour of the Y2O3, Y2O3-AG: Eu3+ nanophosphors were verified through X-Ray diffraction (XRD), scanning electron microscopy (SEM) and Fourier-transform infrared (FT-IR) techniques. Further, the optical and photoluminescence properties and its corresponding CIE coordinates for its color purity was investigated. XRD results showed the pure Y2O3 phosphors were crystalized into a cubic phase structure while the Y2O3-AG phosphors showed variation in the cubic structure. This is due to the substitution of the anionic groups into pure Y2O3 nanophosphors. SEM results indicated that the particles were formed in different size and shapes in the micrometre range when Y2O3 was substituted with different anionic groups and doped Eu3+ ions. FT-IR revealed the presence of the various structural groups in the Y2O3, Y2O3-AG: Eu3+ nanophosphors. Using diffuse reflection data the optical band gap energy values were obtained with Kubelka-Munk function theory. Upon the 398 nm excitation wavelength light, Y2O3-AG: Eu3+ phosphors were emitting red color light at the 618 nm wavelength. Among all samples, Y2O3-SO4: Eu3+ produced the highest intensity of red color emission. The CIE color coordinates suggested that these phosphors are potential candidates for producing red color components in the white LEDs applications.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

Consent on use of personal information: Abstract Submission

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