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CaWO4:Eu(III) based phosphors, characteristics and novel applications

The synthesis and characterization of calcium tungstate-based micro-nanophosphors will be presented. These materials were prepared using the spray pyrolysis technique. Based on Scanning Electron Microscopy measurements, both CaWO4 and CaWO4:Eu (III) exhibit a quasi-spherical shape. CaWO4 displays blue luminescence originating from electron transitions within unperturbed WO4 complexes. In contrast, the luminescent properties of CaWO4:Eu (III) arise from the presence of Eu(III) ions, which emit light at wavelengths of 591, 615, 655, and 702 nm. These emissions stem from radiative transitions from the excited state 5D0 to 7Fj (j =1,4) inter-level transitions within the electronic energy states of Eu (III) [1].

These phosphors undergo testing in three different scenarios to explore potential and innovative applications. The first scenario involves blending them with a commercial 3D printing photocurable resin (Sain Smart 101-90-840TS) and infusing the resin with their luminescent properties, resulting in a 3D luminescent photocurable resin emitting red light. In the second scenario, the phosphors areincorporated into transparent glasses to create Phosphor in Glasses (PIGs), a concept currently under investigation for laser applications [2]. Finally, the third scenario involves utilizing the phosphors for the Visualization of Latent Fingerprint, leveraging the excellent powder luminescent characteristics
of CaWO4, which has been previously employed for this purpose [3].

Keywords

CaWO4:Eu (III), 3D luminescent photocurable resin, Phosphor in Glasses (PIGs),

Reference

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