

Red and green emitting CTAB assisted CdSiO₃:Tb³⁺/Eu³⁺ nanopowders as fluorescent labeling agents used in forensic and display applications

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Abstract:

Nano technology created numerous applications in surface based science due to their reduced size and larger surface area. This offers new promises in surface-based science containing latent fingerprints (LFPs) on porous and non-porous surfaces and anti counterfeiting applications. Conversely, currently used traditional fluorescent powders have several shortcomings due to low sensitivity, high background hindrance and high toxicity. To overcome with these difficulties, we reported rare earth (Tb or Eu) doped cadmium silicate nano powders synthesized via eco-friendly ultrasound assisted sonochemical route as a substitute for the commercially available fluorescent powders. The obtained products were well characterized by XRD, SEM, DRS, TEM etc. The optimized CdSiO₃: Tb³⁺/Eu³⁺ (5 mol %) nano powders (NPs) were used for the visualization of LFPs on various porous and non-porous surfaces. CIE and CCT results revealed that the phosphor was highly useful for the fabrication of red and green emitting diodes in display device and WLED applications. The optimized NPs will create a fangled prospect to visualize LFPs and anti-counterfeiting applications.

Keywords

Sonochemical synthesis; Latent fingerprint; Anti-counterfeiting; Displays devices
Porous and non-porous surfaces