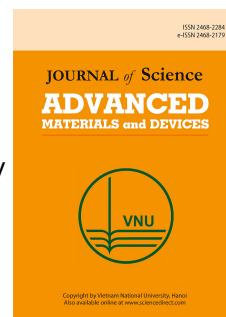


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Luminescent properties of Tb doped gadolinium aluminate nanophosphors for display and forensic applications

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Abstract

A novel green light emitting $\text{GdAlO}_3:\text{Tb}^{3+}$ (1- 11 mol %) nanophosphor has been synthesized by the solution combustion method and the final products characterized. The energy band gap of the samples were estimated in the range of 5.13 – 5.88 eV from diffuse reflectance spectra. The effect of the added Tb^{3+} ions on the electronic structure was estimated based on the absolute electronegativity. The characteristic photoluminescence emission corresponding to $^5\text{D}_4 \rightarrow ^7\text{F}_j$ ($j=6, 5, 4, 3$) of the Tb^{3+} ions was observed in the wavelength range of 500-650 nm, due to the f-f transitions upon the 378 nm excitation. The optimized nanophosphor was found suitable for in the latent fingerprint detection. The photometric characterization has revealed the excellent color chromaticity coordinates and the correlated color temperature values. They are on the same level of commercial phosphors and quite useful for green WLEDs, solid state displays and forensic applications as well.

Keywords: Combustion; Nanophosphor; Diffused Reflectance; Photoluminescence; Latent fingerprint;

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