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Effect of Gd3+ moles on the structure, morphology and luminescence properties of BaAl2O4:x% Gd3+ (0 ≤ x ≤ 1) nanomaterial prepared using a sol-gel method.

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In this study BaAl2O4:x%Gd3+ (0≤ x≤ 1) nanomaterial were prepared using sol-gel mathod. X-ray diffraction (XRD) data revealed that all samples consisted of a single phase of cubic BaAl2O4 structure with no impurities. Fourier Transformation Infrared spectroscopy (FTIR) revealed four absorption bands at 843, 1016, 1416, and 3434 cm-1. The presence of Ba, Al, O and Gd were confirmed by the energy dispersive Xray spectroscopy (EDS). Scanning electron microscope (SEM) revealed that the morphology of the prepared samples highly depends on the Gd3+ concentration. Transmission electron microscopy (TEM) results revealed the tubular rods and nano-nature of the crystallite sizes. Photoluminescence (PL) spectroscopy results revealed three emission peaks located at 414 nm, 436 nm, -and 748 nm . All the emissions are from the host, all this emissions are attributed to arise from the intrinsic defects within the host material such as oxygen. The results revealed the Gd3+ optimum intensity at 0.6% Gd3+. This suggests that increasing the concentration of Gd3+ in the host influences the luminescence of the nano-powders. The International Commission on Illumination (CIE) colour showed that the violet emission colour of the prepared samples depends on the excitation wavelength and Gd3+ concentration.

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

No

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

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