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Authors: Vijay Singh, N. Singh, M.S. Pathak, V. Natarajan, Nitin A. Jadhav



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Luminescence and ESR study of Gd^{3+} doped $Ca_3Al_2O_6$ phosphor

Vijay Singh ^{a,*}, N. Singh ^a, M. S. Pathak ^a, V. Natarajan ^b, Nitin A. Jadhav ^c

^a Department of Chemical Engineering, Konkuk University, Seoul 05029, Korea

^b Institute of Advanced Research, Gandhinagar, Gujarat, 382007, India

^c Vidya Pratishthan's Kamalnayan Bajaj Institute of Engineering and Technology, Baramati, Pune, 413133, India

***Corresponding author:**

E-mail: vijayjiin2006@yahoo.com (V. Singh)

Abstract

Gd^{3+} -doped $Ca_3Al_2O_6$ (CA3) phosphor was synthesized using a combustion method. The crystal structure and the phase purity of the sample were characterized by X-ray powder diffraction (XRD). The surface morphology of the sample was studied using a scanning electronic microscope (SEM). The Gd^{3+} -doped $Ca_3Al_2O_6$ phosphor showed an absorption band in the UV spectral region and a narrowband-UVB emission under the excitation of 273 nm. The narrowband-UVB emission at 314 nm corresponds to the $^6P_{7/2} \rightarrow ^8S_{7/2}$ transition of the Gd^{3+} . A dominant line in the region around $g = 2.0$ was observed in the electron spin resonance (ESR) spectrum of the prepared phosphor.

Keywords: Combustion; ESR; Gd^{3+} ; $Ca_3Al_2O_6$; Phosphor; Luminescence

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