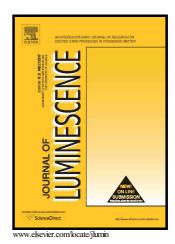
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Narrowband Ultraviolet B Emitting Gd Doped CaAl₂O₄

Phosphors - An ESR and Photoluminescence Study

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Abstract

Phosphors with the composition $Ca_{1-x}Gd_xAl_2O_4$ (x = 0.0025 to 0.09) were synthesized

by a simple combustion route in a short time. The formation of the as-prepared combustion

products was confirmed by the X-ray diffraction analysis, indicating the formation of a

monoclinic phase. The PL spectroscopy assessment shows that with increasing Gd3+

concentration, the ultraviolet emission from Gd^{3+} at 314 nm (${}^{6}P_{7/2} \rightarrow {}^{8}S_{7/2}$) progressively

enhanced. The Gd³⁺-doped CaAl₂O₄ displays electron spin resonance signals with the

effective g values at $g \approx 1.95$, 2.9, and 3.7. Additional lines were also observed at the

approximate g values of ~2.2 and 5.3. Gd³⁺ ion located in the distorted surroundings and

experiencing relatively strong crystal field, give rise to low field lines. Distorted surroundings

in the present system may result from the nearness of the charge compensator oxygen

vacancies.

Keywords: Combustion; XRD; ESR; Gd³⁺ ions; CaAl₂O₄; Photoluminescence

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1

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