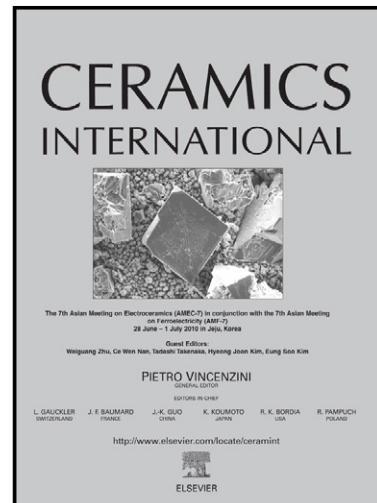


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PII: S0272-8842(14)00876-1  
DOI: <http://dx.doi.org/10.1016/j.ceramint.2014.06.004>  
Reference: CERI8689

To appear in: *Ceramics International*

Received date: 12 April 2014  
Revised date: 23 May 2014  
Accepted date: 1 June 2014

Cite this article as: Yanping Yu, Haohao Wang, Langkai Li, Yibin Chen, Renjie Zeng, Effects of various fluxes on the morphology and optical Properties of  $\text{Lu}_{3-x}\text{Al}_5\text{O}_{12}:\text{XCe}^{3+}$  green phosphors, *Ceramics International*, <http://dx.doi.org/10.1016/j.ceramint.2014.06.004>

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Effects of Various Fluxes on the Morphology and Optical Properties of  $\text{Lu}_{3-x}\text{Al}_5\text{O}_{12}:$   
 $x\text{Ce}^{3+}$  Green Phosphors

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Abstract:

$\text{Lu}_{3-x}\text{Al}_5\text{O}_{12}:$   $x\text{Ce}^{3+}$  (LuAG:  $\text{Ce}^{3+}$ ) green phosphors were synthesized by a two-step solid state reaction method. Morphology and optical properties of the phosphors were studied by adding various fluxes ( $\text{BaF}_2$ ,  $\text{H}_3\text{BO}_3$ ,  $\text{NH}_4\text{Cl}$  and  $\text{NaF}$ ), as well as the concentration of different flux materials were optimized for maximum luminescence intensity. X-ray diffraction, scanning electron microscopy and photoluminescence spectra measurement were used to investigate crystal structure, particle morphologies and luminescence properties, respectively. The obtained phosphors with fluxes possessed better particle morphologies than that of the phosphors without fluxes. The particle size distribution and the luminescence intensity of the obtained phosphors were predominantly dependent on the type and concentration of flux materials. The results showed that the maximum luminescence intensities were found with the following order:  $\text{BaF}_2$  (3 wt.%) >  $\text{NaF}$  (0.5 wt.%) >  $\text{NH}_4\text{Cl}$  (2 wt.%) >  $\text{H}_3\text{BO}_3$  (4 wt.%) > No flux.

Keywords: A. Solid state reaction; B. Spectroscopy; C. Optical properties; Fluxes

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