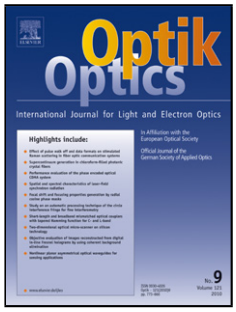

Title: A near-ultraviolet (NUV) converting blue-violet $Mg_{2-x}Al_{3.96}Si_{5.04}O_{18}$:x$Ce^{3+}$ phosphor for white light-emitting-diodes (w-LEDs)

Authors: Rui Yang, Cong Zhao, Rong-ming Wan, Da-chuan Zhu

PII: S0030-4026(17)30813-6
DOI: http://dx.doi.org/doi:10.1016/j.ijleo.2017.07.004
Reference: IJLEO 59399

To appear in:

Received date: 9-1-2017
Accepted date: 3-7-2017

Please cite this article as: Rui Yang, Cong Zhao, Rong-ming Wan, Da-chuan Zhu, A near-ultraviolet (NUV) converting blue-violet Mg2-xAl3.96Si5.04O18:xCe3+ phosphor for white light-emitting-diodes (w-LEDs), Optik - International Journal for Light and Electron Opticshttp://dx.doi.org/10.1016/j.ijleo.2017.07.004

A near-ultraviolet (NUV) converting blue-violet $Mg_{2-x}Al_{3.96}Si_{5.04}O_{18}:xCe^{3+}$ phosphor for white light-emitting-diodes (w-LEDs)

Rui Yang[a,c], Cong Zhao[a,*], Rong-ming Wan[b], Da-chuan Zhu[b,*]

a. Research Institute for New Materials Technology, Chongqing University of Arts and Sciences, Yongchuan Chongqing 402160, China;
b. College of material science & engineering, Sichuan University, Sichuan Chengdu, 610065, China;
c. Guizhou Anshun JianGong building materials co., LTD, Guiyang, 561000, China;

Abstract: A phosphor $Mg_{2-x}Al_{3.96}Si_{5.04}O_{18}:xCe^{3+}$, x = 0.02-0.14 for white NUV w-LEDs has been prepared using solid-state reaction method. The as-obtained phosphors have been investigated by fluorescence spectrophotometer and XRD, respectively. The XRD data demonstrate the aim phase has been synthesized and the diffraction peaks have shifted with the increasing of Ce^{3+} concentration. The $Mg_{2-x}Al_{3.96}Si_{5.04}O_{18}:xCe^{3+}$ phosphor shows a strong blue-violet emission under the excitation of NUV radiation. The fitting results of the emission spectra show the emission spectrum contains two single bands, which come from the transition of $^2D_{2/3}\rightarrow{}^2F_{7/2}$ and $^2F_{5/2}$ of the Ce^{3+} ion. The colorimetric coordinate of sample with x = 0.06 is (0.1499, 0.0704), locating in blue-violet region. We have obtained bright blue-violet light via pumping the sample by NUV light ($\lambda \approx 302$ nm), suggesting that this material be potential as a NUV converting blue-violet phosphor for the NUV w-LEDs.

Keywords: NUV w-LEDs, solid-state reaction, crystal structure, $Mg_2Al_{3.96}Si_{5.04}O_{18}$, phosphors

*Corresponding author,
Address: a. Research Institute for New Materials Technology, Chongqing University of Arts and Sciences, Yongchuan Chongqing 402160, China.
E-mail address: kinlin163@qq.com