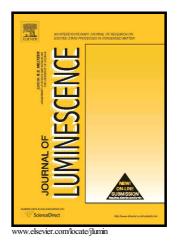
Author's Accepted Manuscript

Synthesis and photoluminescence properties of redemitting NaLaMgWO₆:Sm³⁺,Eu³⁺ phosphors for white LED applications

Qian Yang, Guifang Li, Yunge Wei, Hongyu Chai



 PII:
 S0022-2313(17)31597-1

 DOI:
 https://doi.org/10.1016/j.jlumin.2018.03.011

 Reference:
 LUMIN15430

To appear in: Journal of Luminescence

Received date: 15 September 2017 Revised date: 5 March 2018 Accepted date: 6 March 2018

Cite this article as: Qian Yang, Guifang Li, Yunge Wei and Hongyu Chai, Synthesis and photoluminescence properties of red-emitting NaLaMgWO₆:Sm³⁺,Eu³⁺ phosphors for white LED applications, *Journal of Luminescence*, https://doi.org/10.1016/j.jlumin.2018.03.011

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Synthesis and photoluminescence properties of red-emitting NaLaMgWO₆:Sm³⁺,Eu³⁺ phosphors for white LED applications

Qian Yang ^a, Guifang Li ^a *, Yunge Wei ^a, Hongyu Chai ^b

^a School of Advanced Materials and Nano Technology, Xidian University, Xi'an, 710071, China

^b Beijing Microelectronics Technology Institute, Beijing, 100076, China

Abstract: A series of red-emitting NaLaMgWO₆:Sm³⁺,Eu³⁺ phosphors were successfully synthesized by the solid-state reaction method. The crystal structure, morphology and photoluminescence properties were investigated in detail. The NaLaMgWO₆ compound has monoclinic structure with the space group *C2/m*. Upon excitation of the near-ultraviolet light, the Sm³⁺ singly doped and Eu³⁺singly doped phosphors exhibit red emission at 600 nm (${}^{4}G_{52} \rightarrow {}^{6}H_{7/2}$ transition of Sm³⁺) and 617 nm (${}^{5}D_{0} \rightarrow {}^{7}E_{2}$ transition of Eu³⁺), respectively, while the Sm³⁺, Eu³⁺ co-doped phosphors show the characteristic transition of Eu³⁺ whether excited by 397 or 406 nm. This indicates the existence of the energy transfer from Sm³⁺ to Eu³⁺ ions. Furthermore, the mechanism of energy transfer and energy transfer efficiency were confirmed by the decay time of Sm³⁺ ion in NaLaMgWO₆:Sm³⁺,Eu³⁺ phosphors. The mechanism of energy transfer between Sm³⁺ and Eu³⁺ is proved to be dipole-dipole interaction, and the energy transfer efficiency of NaLa_{0.65}MgWO₆:0.05Sm³⁺,0.3Eu³⁺ phosphor is calculated to be 38.89%. The temperature dependent emission spectra demonstrate that the NaLaMgWO₆:Sm³⁺,Eu³⁺ phosphor has a good thermal stability with an thermal activation energy Δ E of 0.241 eV. The CIE chromaticity coordinate is calculated to be (x = 0.661, y = 0.339).

Keywords: Red phosphors, Photoluminescence, Energy transfer, White LEDs

Tel: +86 29 8189 1417.

E-mail address: gfli@mail.xidian.edu.cn (G. Li).

^{*}Corresponding author at: School of Advanced Materials and Nano Technology, Xidian University, Xi'an 710071, PR China.

Download English Version:

https://daneshyari.com/en/article/7840146

Download Persian Version:

https://daneshyari.com/article/7840146

Daneshyari.com