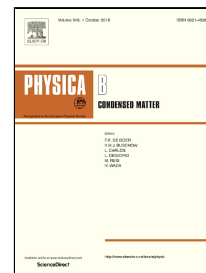


# Accepted Manuscript

Dependence of Manganese phosphorescence on crystal lattice sites of spinel aluminate hosts

M.C. Manaka, M.S. Dhlamini, B.M. Mothudi



PII: S0921-4526(18)30515-5

DOI: 10.1016/j.physb.2018.08.034

Reference: PHYSB 311021

To appear in: *Physica B: Physics of Condensed Matter*

Received Date: 18 May 2018

Accepted Date: 18 August 2018

Please cite this article as: M.C. Manaka, M.S. Dhlamini, B.M. Mothudi, Dependence of Manganese phosphorescence on crystal lattice sites of spinel aluminate hosts, *Physica B: Physics of Condensed Matter* (2018), doi: 10.1016/j.physb.2018.08.034

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 proof before it is published in its final 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.

# Dependence of Manganese phosphorescence on crystal lattice sites of spinel aluminate hosts

M.C. Manaka, M. S. Dhlamini\*, B. M. Mothudi

<sup>a</sup> Department of Physics, University of South Africa, Private Bag X6, Florida, 1710, South Africa

Corresponding Author: [dhlamms@unisa.ac.za](mailto:dhlamms@unisa.ac.za)

## Abstract

This work investigates the structural and optical properties of  $\text{SrAl}_2\text{O}_4: 2\%\text{Mn}^{2+}$  and  $\text{BaAl}_2\text{O}_4: 2\%\text{Mn}^{2+}$  nano-phosphors. These nano-phosphors were synthesized by a conventional combustion method at 600 °C, using urea as a fuel. The effects of crystal lattice sites, hence the crystal field on the electronic transitions of  $\text{Mn}^{2+}$  have been investigated. The crystal structures, morphology, and photoluminescence properties of  $\text{SrAl}_2\text{O}_4: 2\%\text{Mn}^{2+}$  and  $\text{BaAl}_2\text{O}_4: 2\%\text{Mn}^{2+}$  nano-phosphors have been studied. The crystal structures, morphology, and photoluminescence studies were carried out using X-ray diffraction (XRD) spectrometer, field emission scanning electron microscope (HRSEM), and photoluminescence (PL) spectrofluorometer respectively. XRD patterns confirmed the hexagonal and monoclinic structures of  $\text{BaAl}_2\text{O}_4$  and  $\text{SrAl}_2\text{O}_4$  respectively. The crystallite sizes were also averaged from XRD peaks in all samples using Scherrer equation, and they were found to be at nano scale. SEM micrographs revealed irregular shaped particles both in  $\text{SrAl}_2\text{O}_4: 2\%\text{Mn}^{2+}$  and  $\text{BaAl}_2\text{O}_4: 2\%\text{Mn}^{2+}$  nano-phosphors. Energy dispersive x-ray spectroscopy (EDS) analysis confirmed the presence of Mn in  $\text{BaAl}_2\text{O}_4: 2\%\text{Mn}^{2+}$  and  $\text{SrAl}_2\text{O}_4: 2\%\text{Mn}^{2+}$  samples. Under 426 nm excitation, PL emission spectrum of  $\text{SrAl}_2\text{O}_4: 2\%\text{Mn}^{2+}$

Download English Version:

<https://daneshyari.com/en/article/11029452>

Download Persian Version:

<https://daneshyari.com/article/11029452>

[Daneshyari.com](https://daneshyari.com)