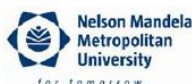




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## The effect of urea ratio on structural and luminescence properties of YVO<sub>4</sub>:Dy phosphor

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The effect of urea ratio on structural and luminescence properties of YVO<sub>4</sub>:Dy phosphor

### 1. Introduction

Although the luminescence characteristics of vanadates phosphors have been reported, yttrium vanadates (YVO<sub>4</sub>) are good host materials for luminescence efficiency. Like Eu, Tm and other rare earth ions, Dy can also act as a useful activator. Many researchers have reported that YVO<sub>4</sub> can be modified by Eu to be used as red phosphor in colour television and cathode because of its high luminescence [1]. Besides europium, Dy ions is a good activator for YVO<sub>4</sub>: Dy<sup>3+</sup>. Synthesis of YVO<sub>4</sub> has previously been prepared by various methods. Here YVO<sub>4</sub>:Dy was prepared by combustion method at initiation temperature of 600 °C. Combustion method is one of an ideal technique, because exothermic reaction was initiated at the ignition temperature and it generates heat which was manifested in a maximum temperature of 100-1650 K.

### 1. Results

Figure 1 shows the XRD patterns of the YVO<sub>4</sub>:Dy powders synthesized by combustion method at initiation temperature of 600 °C with different mole ratios of urea. The phosphor powder showed that the peaks were due to YVO<sub>4</sub> tetragonal phase (JCPDS 17-0341). No other crystalline phase was detected on XRD spectra. Scanning electron microscopy results showed when increasing ratio of urea the agglomeration of particles decreases and the nanorod-like shape structure starts to form. Figure 2 shows the emission spectra obtained from excitation of 282 nm. The emission spectra consist of two main peaks, yellow band at 573 nm corresponding to 4F<sub>9/2</sub>→6H<sub>13/2</sub> and the blue band (482 nm) corresponds to the 4F<sub>9/2</sub>→6H<sub>15/2</sub> transition. There is a very weak band at 663 nm which correspond to 4F<sub>9/2</sub>→6H<sub>11/2</sub> transition. The intensity of the yellow emission is stronger than that of blue emission, this is because when the Dy<sup>3+</sup> ions is located at low symmetry local sites with no inversion centers, the 4F<sub>9/2</sub>→6H<sub>13/2</sub> transition is prominent in its emission spectrum.

### 1. References

- [1] J. Wang, Y. Xu, M. Hojamberdiev, Y. Cui, H. Liu and G. Zhu, J. of Alloys and Compounds. 479 (2009), 772-776.
- [2] H. Zhang, X. Fu, S. Niu and Q. Xin, J. of Alloys and Compounds. 457 (2008) 61-65.

**Are you currently a postgraduate student? (Yes/No)**

yes

**At what level of studies are you currently? (Hons/MSc/PhD)**

PhD

**Please provide the name and email address of your supervisor.**

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