

# SAIP2012



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## **Synthesis and characterization of green $\text{SrAl}_2\text{O}_4:\text{Tb}^{3+}$ phosphor using solution combustion method**

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### **Abstract :**

$\text{SrAl}_2\text{O}_4:\text{Tb}^{3+}$  phosphors doped with different concentration of Tb were synthesized by solution combustion method. The crystalline structure, morphology and luminescent properties of the phosphors were studied by X-ray diffraction (XRD), scanning electron microscope (SEM) techniques and photoluminescence (PL) spectroscopy respectively. The XRD analysis reveal polycrystalline monoclinic structure and the calculated average particle sizes ranged between 80 and 90 nm. SEM images show non uniform and irregular shapes of the particles. The  $\text{Tb}^{3+}$  doped  $\text{SrAl}_2\text{O}_4$  phosphor shows a green emission when illuminated by 229 nm. The emission spectra show the weak blue emission in the region of 415–459 nm and strong green emission in 489–622 nm. The 4f–4f emission from 5D<sub>4</sub> to 7F<sub>J</sub> (J= 6, 5, 4, 3) states of  $\text{Tb}^{3+}$  are found at 489, 543, 585 and 622 nm, respectively. Other emission peaks from the 5D<sub>3</sub> to 7F<sub>J</sub> (J=5, 4, and 3) transitions were also found at 415, 436, and 459nm. The decay curves of  $\text{SrAl}_2\text{O}_4:\text{Tb}^{3+}$  phosphor showed the rapid decay and long afterglow. Intensity of the phosphorescent decreases as the concentration of terbium ions increased in host lattice.

### **Award :**

Yes

### **Level :**

Msc

### **Supervisor :**

Dejene BF (dejenebf@qwa.ufs.ac.za) University of the Free State

### **Paper :**

Yes

**Primary authors :** Ms. FOKA, Kewele Emily (University of the Free State)

**Co-authors :** Prof. SWART, Hendrick (Co-Supervisor)

**Presenter :** Ms. FOKA, Kewele Emily (University of the Free State)

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