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Enhanced photoluminescence emission from Dy^{3+} and Tb^{3+} activated lanthanum phosphovanadate

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Abstract content (Max 300 words) http://events.saip.org.za/getFile.py/?target=_blank **Formatting** **Special chars**

Dysprosium and terbium doped lanthanum phosphovanadate ($\text{La}_{0.25}\text{P}_{0.75}\text{O}_4$) Dy^{3+} and Tb^{3+} phosphor powders were synthesized by the solution combustion method. X-ray diffraction (XRD) was used to investigate phase formation of the prepared phosphor powder. Scanning electron microscopy (SEM) images revealed that the prepared powder consisted of different shapes and sizes. Elemental composition was examined by energy dispersive x-ray spectroscopy (EDS), while the stretching mode frequencies were determined by Fourier transform infrared spectroscopy (FTIR). The band gap was estimated from the diffuse reflectance spectra. The excitation spectra of both dysprosium and terbium doped samples showed a strong broad band extending from 200 to 350 nm with the maximum at $\lambda \approx 274$ nm. Photoluminescence emission spectra for dysprosium doped samples showed two peaks at 480 nm (${}^4\text{F}_{9/2} \rightarrow {}^6\text{H}_{13/2}$) and 573 nm (${}^4\text{F}_{9/2} \rightarrow {}^6\text{H}_{15/2}$) corresponding to Dy^{3+} emission while four emission peaks were observed for terbium doped samples at 490 nm (${}^5\text{D}_{2} \rightarrow {}^7\text{F}_{5}$), 544 nm (${}^5\text{D}_{2} \rightarrow {}^7\text{F}_{5}$), 586 nm (${}^5\text{D}_{2} \rightarrow {}^7\text{F}_{2}$) and 623 nm (${}^5\text{D}_{2} \rightarrow {}^7\text{F}_{5}$) corresponding to transitions of Tb^{3+} ions. These photoluminescence results further revealed that the PL intensity increases with an increase in temperature.

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N/A

Main supervisor (name and email) and his / her institution

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