



Contribution ID: 71

Type: **Poster Presentation**

Characterization of Ce³⁺ doped ZnO nano-powders co-doped with different concentrations of Eu³⁺ in polymer films of PVC, PCL and PVC/PCL blends

Tuesday, 4 July 2017 17:10 (1h 50m)

Luminescent nanoparticles are used in many fields of applications, such as bio-imaging, nano-sensors as well as in light emitting diodes. Nanoparticles of ZnO and Ce³⁺ doped ZnO co-doped with Eu³⁺ are synthesized by the chemical bath deposition method and then embedded in polymer matrixes of PVC, PCL and a PVC-PCL blend via the solution casting method. The optical properties of these polymer based Ce³⁺ doped ZnO co-doped with different concentrations (x %) Eu³⁺ nanomaterials were studied. Parameters such as transmittance, absorption coefficient and energy band gap were determined by employing the Tauc's plot. UV-Vis spectra of the polymer films showed a slight decrease in the band gap energy when Ce³⁺ doped ZnO co-doped with various amounts of Eu³⁺ nano-powders were dispersed through the polymer matrix. Scanning electron microscope showed that ZnO nanoparticles were found to spread more homogeneously in the PVC-PCL blend matrix than through the matrix of the unit polymers of PVC or PCL. The photoluminescence results showed polymer films exhibited a luminescence band around 444 nm. Eu³⁺ in the co-doped nanoparticles brought about an increase in the luminescent intensity of the polymer films at excitations around 252, 286 and 326 nm. Further increase in intensity was found when the PVC-PCL blend matrix was used. This increase is attributed to the effective interaction between the nanoparticles of Ce³⁺ doped ZnO co-doped with x % of Eu³⁺ and the PVC-PCL blend matrix.

Apply to be considered for a student award (Yes / No)?

No

Level for award (Hons, MSc, PhD, N/A)?

PhD

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

Dr Lehlohonolo F Koao, email: koaolf@ufs.ac.za, University of the Free State (Qwaqwa Campus), Department of Physics

Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

Yes

Primary author: Mrs MALIMABE, Moipone Alice (University of the Free State (Qwaqwa))

Co-authors: Prof. SWART, Hendrik (University of the Free state); Dr SEFADI, Jeremia (Sol Plaatje University); Prof. VON ESCHWEGE, Karel (University of the Free State); Dr KOAO, Lehlohonolo F (University of the Free State (Qwaqwa))

Presenter: Mrs MALIMABE, Moipone Alice (University of the Free State (Qwaqwa))

Session Classification: Poster Session 1

Track Classification: Track A - Division for Physics of Condensed Matter and Materials