Contribution ID: **284** Type: **Poster Presentation**

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Wednesday, 5 July 2017 17:10 (1h 50m)

Effect of Cr3+ doping on structural, electronic and optical property of ZnGa2O4 for bio imaging application
Hussen M. K.*, Dejene B.F,
Department of Physics, University of the Free State (Qwaqwa Campus), Private Bag X13,
Phuthaditjhaba, 9866, South Africa
* Corresponding author: Tel: +27 58 718 5269; Fax: +27 58 718 5444;
E-mail:megekasim@gmail.com
Key words:ZnGa2O4 nanoparticles, Citric acid, Cubic, Blue emission,Bio-imaging
Abstract:This paper reports the material properties of undoped and Cr3+ -doped zinc gallate (ZnGa2O4) nanopowder synthesized by citric acid assisted sol-gel method doped with chromium of different molar concentrations (0.005– 0.025%).The XRD patterns revealedthat all the nano powders synthesized are cubic structured and Cr-doping did not affect the structure at all. The SEM micrographs show that nano powders are nearly spherical but became agglomerate with high doping of chromium concentrations. EDSmeasurement confirm the presence of the Zn, Ga, O and Cr ions.UndopedZnGa2O4nanopowder displace a broad blue emission but doping Cr ions caused the emission to occur in the near infrared region. An increase in Cr ions leads significantly enhancement in the NIR emission. The PL emission wavelength was also observed to dependent on the excitation wavelength and these nanomaterials can effectively be usedfor bio imaging application [1]. The TL intensity was recorded for different UV irradiation and it display a single broad glow curve while the glow the intensity is seen to increase with increasing UV expose time. The effect of different heating rates was also studied and is seen to cause peak temperature shifts. Repeated measurements on the same sample seem not to have any effect on peak temperature positions and TL intensity indicating the sample was stable.

Reference: [1] K. J. Lee, MSc thesis, Texas A&M University, 2005

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Primary author: Mr HUSSEN, megersa kasim (UFS)

Co-author: Prof. DEJENE, BF dejene (UFS)

Presenter: Mr HUSSEN, megersa kasim (UFS)

Session Classification: Poster Session 2

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