Contribution ID: **25** Type: **Oral Presentation**

Effect of Li+ ion on the structural, morphological and luminescent properties of Y2O3:Tm3+ nanophosphor

Tuesday, 26 June 2018 10:20 (20 minutes)

Rare-earth ions doped nanocrystals are increasingly important as an active media for solid-state lasers which efficiently operate under diode pumping. Among them the thulium (Tm3+) ion could be an attractive activator with suitable absorption for commercial diode pumping. In addition to this, it shows long fluorescence life times and it is suitable for large energy storage devices. Tm3+ doped yttrium oxide (Y2O3) and lithium (Li+) co-doped Y2O3:Tm3+ were prepared by the solution combustion technique. The samples were annealed at 900 ℃ to obtain crystalline phases. X-ray diffraction patterns confirmed the cubic phase of Y2O3. The crystallite sizes were calculated by using the Scherrer formula and was found to be in the order of 20 nm. The particles were found to be spherical in nature and their sizes were estimated to be 37 nm by the scanning electron microscope technique. A sharp andstrong photoluminescence (PL) emission peak at 453 nm was observed in the pristine and in the Li+ co-doped Y2O3:Tm3+ sample. The emission peak at 453 nm was assigned to the 1G4⟶3H6 transition. It was found that the PL intensity increased with the Li ion concentration up to 4 mol% and then it decreased with a further increase of Li ion concentration. The 4 mol% Li+ co-doped material showed a strong blue emission. The 4 mol% Li+ co-doped material exhibited a long decay. Thermoluminescence (TL) glow curves were obtained for the samples exposed with a UV light at room temperature. These glow curves showed peaks at 323 K, 356 K and 583 K and the intensities linearly increased upto a Li+ concentration of 4 mol%. Whereas, the pristine sample showed low intensity. The detailed TL kinetic parameters were evaluated by a glow curve deconvoluted technique.

Please confirm that you
have carefully read the
abstract submission instructions
under the menu item
”Call for Abstracts”
(Yes / No)

Yes

Consideration for
student awards
Choose one option
from those below.
N/A
Hons
MSc
PhD

PhD*

Supervisor details
If not a student, type N/A.
Student abstract submision
requires supervisor permission:
please give their name,
 institution and email address.

Prof. Liza Coetsee-Hugo
UFS, South Africa
coetseee@ufs.ac.za

Primary author: Dr N J, Shivaramu (Department of Physics, University of the Free State, Bloemfontein, ZA-9300, South Africa)

Co-authors: Prof. COETSEE, E (Department of Physics, University of the Free State, Bloemfontein, ZA-9300, South Africa); Prof. H C, Swart (Department of Physics, University of the Free State, Bloemfontein, ZA-9300, South Africa)

Presenter: Dr N J, Shivaramu (Department of Physics, University of the Free State, Bloemfontein, ZA-9300, South Africa)

Session Classification: Physics of Condensed Matter and Materials

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