



Contribution ID: 288

Type: **Poster Presentation**

## Study of structural damage in InGaN thin films due to Cu ion irradiation

Thursday, 11 July 2019 15:00 (2 hours)

The influence of erbium (Er<sup>+</sup>) ion irradiation on the structural modification in indium gallium nitride (InGaN) thin films is studied by a combination of Rutherford backscattering spectrometry and channeling (RBS/C) and Raman spectroscopy. Epitaxial InGaN thin films, with thicknesses of 20 nm, grown on sapphire substrates with gallium nitride (GaN) buffer layers, were irradiated with 170 keV Er<sup>+</sup> ions at fluences of  $1 \times 10^{14}$ ,  $5 \times 10^{14}$  and  $1 \times 10^{15}$  ions/cm<sup>2</sup> at room temperature. Structural properties of the films were investigated to understand the effects of ion fluence on the irradiated thin films. RBS/C results show that the calculated channelling minimum yield ( $X_{min}$ ) of the films decreases with increasing ion fluence, indicating that the crystalline quality of the InGaN thin films has improved. However, at high fluences RBS results exhibit sputtering of the InGaN layer. Results of this study confirms that the previously observed re-crystallization in InGaN films after ion beam irradiation [1] does not seem to depend on ion beam type or energy and this may have beneficial implications for control of irradiation-induced improvement in InGaN thin films.

[1] Madhuku, M., Husnain, G., Ahmad, I., Saleem, H (2015): Irradiation-induced improvement in crystalline quality of epitaxially grown InGaN thin films: A preliminary study. In: Proceedings of SAIP2014, the 59th Annual Conference of the South African Institute of Physics, edited by Chris Engelbrecht and Steven Karataglidis (University of Johannesburg), 059-065.

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

No

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

PhD

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**Session Classification:** Poster Session 2

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