



Contribution ID: 212

Type: Oral Presentation

## Investigating the effects of Cobalt keV ion implantation on optical and magnetic properties of Indium Tin Oxide (ITO) thin films on flexible PET substrates

Friday, 7 July 2017 12:10 (20 minutes)

Transparent conducting oxide (TCO) thin films exhibit co-existence of electronic conductivity and transparency. These unique properties enable TCOs to be applicable in optoelectronic and other nanodevices. Indium Tin Oxide (ITO) based TCO thin films have been used extensively in many applications, such as solar cells [1]. In particular, ITO has been a choice in flat panel displays as one of its electrodes. The major advantages of ITO are low resistivity, high transmission of visible light and high free carrier density that contributes to its relatively low electrical resistivity [2].

Modification of ITO thin films on polymer substrates using transition metal ion beams is rarely reported in literature. Therefore, to develop better dilute magnetic semiconductor (DMSs) for the improvement of spintronic devices, it is important to investigate dependence of optical and magnetic properties of ITO thin films on Cobalt ion beam implantation.

In this work, studies of ion beam induced modification in ITO thin films used in optoelectronics will be presented. These films were deposited on flexible polyethylene terephthalate (PET) substrate. The ITO thin film samples were implanted with  $\text{Co}^+$  ions at different keV energies and fluences. Optical and magnetic properties of pristine and implanted samples, characterized by X-ray diffraction (XRD), UV-Visible Spectroscopy, Scanning Electron Microscopy (SEM) and Vibrating Sample Magnetometer (VSM), will be presented.

### References

- [1] Andreas Stadler. Transparent Conducting Oxides An Up-To-Date Overview. [www.mdpi.com/journal/materials](http://www.mdpi.com/journal/materials), 5:661–683, 2012.
- [2] V. Gokulakrishnan et al. Effects of  $\text{O}^{7+}$  swift heavy ion irradiation on indium oxide thin films. *Nucl. Instrum. and Methods*, B269:1836–1840, 2011.

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

Yes

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

PhD

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

Yes

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**Session Classification:** Applied Physics

**Track Classification:** Track F - Applied Physics