

## Characterization of sputtered-MgZnO thin films as UV sensors

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ZnO thin films are sensitive to the UV region because of their ultraviolet absorbance and high photoconductivity. These films can be used as an active layer for UV sensors. UV sensors are important in the application point of view which includes high temperature plasma research, space research and communication, satellite-based missile plume detection systems, biomedical instrumentation, military and missile launching and testing [1,2].

In this work, Mg<sub>0.2</sub>Zn<sub>0.8</sub>O thin films were deposited onto ITO/PET, n-Si and glass substrates by radio frequency (RF) magnetron sputtering method under various deposition parameters. Structural, optical and morphological properties of the films were investigated by X-ray diffractometer, UV-Vis spectrometer and atomic force microscope. Then, UV sensing of the fabricated Mg<sub>0.2</sub>Zn<sub>0.8</sub>O thin films-based sensors was explored by using current-voltage (I-V) characteristics. The results showed that our sensors were sensitive in the UV region of the electromagnetic spectrum. This achieved UV sensor might probably be used in flexible device application, and this also opens a new way for fabricating inexpensive flexible devices.

### Acknowledgments

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### References

1. L. Luo, et al., Sens Actuators, A **127**, 201 (2006)
2. S.K. Panda, C. Jacob, Solid-State Electron. **73**, 44 (2012)

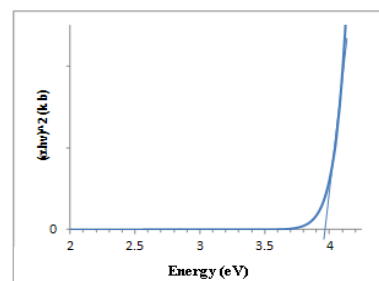


Fig.1 Optical absorption coefficient spectra of the sputtered-MgZnO thin film

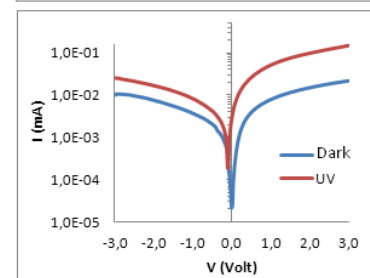
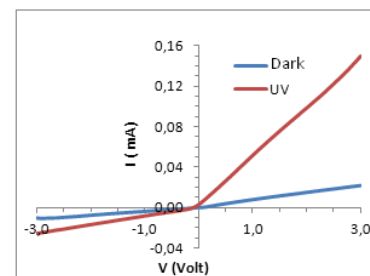


Fig.2 I-V characteristics curve of the sputtered-MgZnO based UV sensor with the linear (a) and logarithmic (b) coordinate in dark and under 365 nm UV light