**Effect of Annealing on ultra thin Zincoxide film and growth of Zincoxide Nanorod for Optoelectronics applications**

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***ABSTRACT***

In this work, a ultra thin (~25nm) Zinc oxide (ZnO) thin film was deposited on the (~100nm)SiO2/Si substrate by using Radio Frequency sputtering. To study the effect of annealing, on the thin films for the growth of ZnO Nanorods. ZnO thin film was annealed at 450oC under argon atmosphere. Surface morphology of the thin films was studied by Atomic force microscopy and X-ray diffraction. Low cost Hydrothermal method was used for the growth of ZnO nanorods on both annealed and unannealed thin films. The structural properties of the ZnO nanorods were characterized by X-ray diffraction and Field Emission Scanning Electron Microscopy with EDX. The effect of annealing was examined by comparing the parameters like growth and orientation of the ZnO nanorods. The impact of annealing ultra thin ZnO films on ZnO Nanorods growth was negligible. The Metal Semiconductor metal based device structure was fabricated by depositing Ti/Au Contact by using thermal evaporator on both the samples. Further, the electrical characteristics were carried out by using semiconductor parameter analyzer. Later the device was exposed to 365nm of Ultra-violet light for its photodetection capability. The devices proved to be a good photo detector. And the obtained result supports positively for their wide applications in the area of electronic and optoelectronic devices.

**Keywords:** Thin Film, Zincoxide, RF Sputtering, Hydrothermal method.