

## **Effect of annealing temperature on electrical properties of hybrid ZnO/PTAA based heterojunction diode**

### **ABSTRACT**

A hybrid type heterojunction diode based on Zinc Oxide (ZnO) and Poly(triarylamine)(PTAA) thin films is fabricated using radio frequency and spin coating method. These are conducted in ambient condition. This research is done to investigate the effects of temperature on Schottky properties of ZnO/PTAA diode. PTAA is chemically dissolved in chloroform solution and deposited onto ZnO thin film at different spin rate of 1000 RPM and 2000 RPM. The fabricated diode is then annealed for 20 mins at a temperature ranging from 100 °C to 150 °C and surface morphological of fabricated diodes is observed using advance material microscope (HIROX). Investigation of current-voltage (I-V) is carried out in various bias voltage from -4.0 V to 4.0 V using Keithley 4-point prob. Investigation revealed that, diode show rectifying behaviour towards the increasing in annealing temperature. The highest ideality factor obtain is 1.62 at 120°C for 1000 RPM with barrier height of 0.745 eV and series resistance of 2.645 KΩ. The barrier height of diodes increases gradually with increasing in temperature while ideality factor decreases. Meanwhile, series resistance decreases significantly over increasing temperature from 4.28 KΩ to 0.412 KΩ for 1000 RPM and 4.166 KΩ to 0.063 KΩ for 2000 RPM. It clearly reveals that the temperature is highly correlated with the ideality factor of the device thus effecting the barrier height and series resistance in the device