**INFLUENCE OF ALUMINIUM DOPING CONCENTRATION ON THE STRUCTURAL AND ELECTRICAL PROPERTIES OF ZINC OXIDE THIN FILMS FABRICATED BY SPRAY PYROLYSIS TECHNIQUE**

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**ABSTRACT**

Aluminium doped ZnO thin films were deposited on glass substrates using spray pyrolysis technique. The doping concentration was varied from 0.5% - 1.5%. X- ray diffraction studies have shown that the deposited films exhibit hexagonal structure with preferred orientation along the (002) plane. The 2ϴ value corresponding to the (002) plane for the undoped thin film is 34.49o and for 0.5%, 1%, 1.5% Al: ZnO samples the values are 34.79o, 34.96o, 35o respectively. The peaks show a slight shift to the right with increase in doping concentration which confirms the incorporation of aluminium in the ZnO thin film. The crystalline size for undoped sample is calculated to be 35.24 nm and it has increased to 36.33 nm for 1% Al doping. The thickness of the thin films is observed to be in the range of few micrometers. Electrical studies were done on the samples using four probe setup and the thin films were found to exhibit semiconducting behavior. The activation energy of the Al doped ZnO thin films was calculated using the slope of the arrhenius plot and it is found to be in the range of 2.18 ev - 2.56 ev.

KEYWORDS: Al doped Zinc Oxide, Spray Pyrolysis, XRD, Four probe method.