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**[SEM-524] STRUCTURAL AND OPTICAL PROPERTIES OF ZnO:Al FILMS
PREPARED BY ULTRASONIC SPRAY PYROLYSIS**

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Thin films of non-stoichiometric and doped metallic oxides of ZnO, In₂O₃, SnO₂, CdO, In₂O₃:Sn (ITO), SnO₂:F, In₂O₃:F, ZnO:Al etc. have attracted a large interest because of their high electrical conductivity and optical transmittance in the visible region of solar spectrum making them suitable for their application in different kinds of opto-electronic devices. Because of the fact that a high conductivity and a high transmittance in the visible region can be achieved simultaneously, they are used as transparent electrodes in thin film solar cells. Among these materials, zinc oxide was felt important compared with tin oxide and indium oxide due to its stability in hydrogen plasma, which is of unique importance in amorphous and microcrystalline silicon areas. The spray technique is one of the most commonly used technique for preparation of transparent and conducting oxides owing to its simplicity, safety, non-vacuum system of deposition and hence inexpensive method for large area coatings. By characterizing the deposition parameters especially the spraying temperature, flow rate and the amount of doping concentration, it is possible to deposit Al-doped ZnO (AZO) thin films having suitable values of sheet resistance and transmittance. Films of zinc oxide doped with Al (ZnO:Al) are prepared using the spray pyrolysis technique. In this work the effect of doping Al on the physical properties of ZnO:Al is studied. Polycrystalline ZnO:Al films with the different Al concentration ([Al]/[Zn] in the starting solution was varied from 0 to 0.2 wt.%) were prepared. We varied the substrate temperature and deposition time. These films were confirmed to show the high crystallinity by X-ray diffraction technique. The optical transmittance was varied from 90% to 40% in visible range depending of the film thickness.

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