Study the Effect of Oblique Deposition on Surface Characterization and Microstructure of Evaporated Cadmium Thin Films

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ABSTRACT

The influence of oblique angle deposition on the surface morphological and microstructure of metallic cadmium films are studied. The films were deposited normally and obliquely at different angles (0°, 50°, and 70°) by vacuum evaporation technique. XRD technique used to study the crystalline structure of these films and shows that the polycrystalline nature of these films and All layers irrespective of deposition parameters develop a preferred (002) plane. The grain size increased with the increase of deposition angle and clearly facetted morphology was observed. The surface morphology of the deposited materials has been studied using atomic force microscopes (AFM) and optical reflection microscope. The AFM results demonstrate that the film deposition at higher oblique angle (70°) has higher surface roughness. Reflection microscope results showed that the smoothness and homogeneity of the films are decreasing with increasing the deposition angle (θ), and the surface roughness increased with increasing angle. The optical characteristics of the prepared thin films have been investigated by UV-VIS spectrophotometer in a wavelength ranging (350-900) nm and shows by increasing the inclination angle of deposition will lead to transmission decreases of the films.

Keywords: Glancing angle deposition, cadmium thin films, AFM, Morphology.