

## **Effect of seed layer on surface morphological, structural and optical properties of CdO thin films fabricated by an electrochemical deposition technique**

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CdO thin films have been grown onto Indium thin Oxide (ITO) coated glass substrates by an electrochemical deposition technique using CdCl<sub>2</sub>.6H<sub>2</sub>O (0.02 M), KCl (0.1 M), solutions at the bath temperature of 70°C and 6.0 pH value. Firstly, CdO thin films were produced without using seed layers at the potential of – 0.71 V. In the next way, the deposition of CdO thin films consisted of two steps. The galvanostatic process to deposit the seed layers and the potentiostatic process for the subsequent film growth were applied. The seed layers were pre-deposited galvanostatically applying different currents such as – 600 µA and – 800 µA and the subsequent CdO thin films had been produced using the potentiostatic mode at the potential of – 0.71 V. CdO thin films were annealed at the temperature of 450°C for 1 h. The surface morphological and structural properties of CdO thin films were studied by x-ray diffraction (XRD), atomic force microscopy (AFM), and scanning electron microscopy (SEM). Optical properties of samples were studied by UV–VIS spectroscopy. X-ray diffraction results showed that CdO thin films formed were polycrystalline with cubic grain structure and the preferred crystallographic orientation of CdO thin film was in the <111> direction. X-ray diffraction results also showed that crystallite sizes of CdO thin films which were produced using the seed layers at the currents of - 600 µA and - 800 µA were 60.9 and 53.0 nm, respectively. On the other hand, the crystallite size of CdO thin films which were produced without using seed layers at the potential of – 0.71 V was 56.9 nm. Energy band gaps of CdO thin films were obtained from the absorbance measurements in the visible range using Tauc theory. Energy band gaps of CdO thin films which were produced using the seed layers at the currents of - 600 µA and - 800 µA were 2.140, and 2.283 eV, respectively. On the other hand, the Energy band gap of CdO thin films which were produced without using seed layers at the potential of – 0.71 V was 2.215 eV. Local elemental characterization on the surface of the CdO thin film was carried out using EDS.

## References

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