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Influence of a novel co-doping (Zn + F) on the physical properties of nano structured (111) oriented CdO thin films applicable for window layer of solar cell(Article)

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Abstract

Un-doped and co-doped (Zn + F) cadmium oxide (CdO) thin films were prepared by modified spray pyrolysis technique using a nebulizer on glass substrates kept at 200 °C. They were characterized by X-ray diffraction (XRD), X-ray photoelectron spectra (XPS), scanning electron microscopy (SEM), UV-vis spectroscopy, Hall Effect and photoluminescence (PL) respectively. The thin films were having thickness in the range of 520–560 nm. They were well crystalline and displayed high transparency of about >70% in the visible region. It was clearly seen from the SEM photographs that co-doping causes notable changes in the surface morphology. Electrical study exhibited the resistivity of co-doped CdO thin films drastically fell to 1.43×10^{-4} Ω-cm compared with the un-doped CdO thin film. The obtained PL spectra were well corroborated with the structural and optical studies. The high transparency, wide band gap energy and enhanced electrical properties obtained infer that Zn + F co-doped CdO thin films find application in optoelectronic devices, especially in window layer of solar cells. © 2018 Elsevier B.V.

Author keywords

CdO | Nebulized spray pyrolysis | Optical properties | Structural properties | Thin films

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