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Effect of substrates on the structural, morphological, and optical properties of sprayed CdO thin films using nebulizer(Article)

Anitha, M., Anitha, N., Kulandaisamy, I., Amalraj, L.

^aDepartment of Physics, V.H.N.S.N College (Autonomous), Virudhunagar, Tamilnadu 626001, India^bPG and Research Department of Physics, Arul Anandar College, Madurai, Tamilnadu 625514, India

Abstract

CdO thin films were deposited on glass, quartz, FTO, silicon wafers of p-type and n-type at 200 °C of substrate temperature employing spray pyrolysis technique using nebulizer. As deposited cadmium oxide thin films were analyzed to find crystallite size, morphology of the substrate, elemental composition and band gap using X-ray diffraction (XRD), scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDAX) and UV-Vis spectrophotometer. Nature of the thin film was found to be polycrystalline with face centered cubic structure with (111) preferential orientation and evaluated structural parameters show significant effect of used substrates. Spherical sized grains were observed on the surface of the thin films using SEM. The EDAX analysis confirmed that cadmium and oxygen were present in the sample. Direct allowed transition with band gap values lying in the range 2.34–2.44 eV for all the films deposited on various substrates. Among, these thin film coated on FTO substrate was found to have high crystallinity with a narrow band gap, which may be more suitable for opto-electronic applications. [Figure not available: see fulltext.]. © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Cadmium oxide Optical properties Substrates TCO Thin film XRD

Indexed keywords

Engineering controlled terms:

Cadmium compounds Crystallite size Energy dispersive spectroscopy Energy gap
Optical properties Oxide films Scanning electron microscopy Silicon wafers Spray pyrolysis
Thin films X ray diffraction

Engineering uncontrolled terms

Cadmium oxide Elemental compositions Energy dispersive X ray spectroscopy
Face centered cubic structure Optoelectronic applications Preferential orientation
Spray-pyrolysis techniques Substrate temperature

Engineering main heading:

Substrates

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(2023) Journal of Materials Science: Materials in Electronics

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