

Author's Accepted Manuscript

Photoluminescence and electrical properties from CdO/Cd-nanocrystallites on Cd foil

Yong Li, Tian Jie Zhang, Yue Li Song, Peng Fei Ji, Feng Qun Zhou, Ming Li Tian, Nai Wen, Shu Qing Yuan



PII: S0022-2313(18)30835-4
DOI: <https://doi.org/10.1016/j.jlumin.2018.06.077>
Reference: LUMIN15739

To appear in: *Journal of Luminescence*

Received date: 11 May 2018
Revised date: 24 June 2018
Accepted date: 26 June 2018

Cite this article as: Yong Li, Tian Jie Zhang, Yue Li Song, Peng Fei Ji, Feng Qun Zhou, Ming Li Tian, Nai Wen and Shu Qing Yuan, Photoluminescence and electrical properties from CdO/Cd-nanocrystallites on Cd foil, *Journal of Luminescence*, <https://doi.org/10.1016/j.jlumin.2018.06.077>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Photoluminescence and electrical properties from CdO/Cd-nanocrystallites on Cd foil

Yong Li¹, Tian Jie Zhang², Yue Li Song¹, Peng Fei Ji¹, Feng Qun Zhou^{1, a)}, Ming Li Tian¹, Nai Wen¹ and Shu Qing Yuan¹

ACCEPTED MANUSCRIPT

¹*Department of Physics and Solar Energy Research Center, Pingdingshan University, Pingdingshan, 467000, P. R. China*

²*Department of Mathematics and Information Science, North China University of Water Resources and Electric Power, Zhengzhou, 450045, P. R. China*

Abstract

CdO, which is an n-type II-VI semiconductor compound, plays an increasingly important role in the optoelectronic field. In this paper, CdO micro-rods have been synthesized through using Cd foil as the Cd²⁺ source and the substrate by a solvothermal method, which are approximately perpendicular to the substrate. Meanwhile, Cd nanocrystallites (nc-Cd) have been fabricated, which are observed to locate at the bottom of CdO micro-rods. Photoluminescence at 10 K has been measured and shown multiple peak emissions. Through analyzing the temperature-dependent photoluminescence and the Varshni formula, the peak located at ~487 nm has been confirmed as the emission of band gap. The peaks of ~501 nm and ~588 nm are disappeared with the increasing of temperature, which are ascribed to the emissions from Cd interstitials to valence band and excitonic transitions, respectively. The peak located at ~715 nm is attributed to the emission of surface defects and shows blue shift with increasing temperature. It may be due to the influence of the existence of nc-Cd located at the bottom of CdO micro-rods and/or the interface between CdO and nc-Cd. The current density vs voltage (I-V characterization) from CdO/nc-Cd on Cd foil shows the obvious rectifying effect. Through analyzing the I-V characterization, it is indicated that there are a lot of defects in the CdO to impede the performance. It is believed that through optimizing the preparation process CdO/nc-Cd on Cd foil will be potentially applied in the future optoelectronic field.

Keywords: CdO, Electronic properties, Optical properties, Luminescence

^{a)} Electronic mail: zhoufq03@163.com (F. Q. Zhou)

Download English Version:

<https://daneshyari.com/en/article/7839726>

Download Persian Version:

<https://daneshyari.com/article/7839726>

[Daneshyari.com](https://daneshyari.com)