

Accepted Manuscript

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PII: S0169-4332(17)32068-8
DOI: <http://dx.doi.org/doi:10.1016/j.apsusc.2017.07.078>
Reference: APSUSC 36612

To appear in: *APSUSC*

Received date: 7-3-2017
Revised date: 19-6-2017
Accepted date: 11-7-2017

Please cite this article as: Sergei Bereznev, Hrachya Kocharyan, Natalia Maticiu, Revathi Naidu, Olga Volobujeva, Andrey Tverjanovich, Julia Kois, One-stage pulsed laser deposition of conductive zinc oxysulfide layers, Applied Surface Science <http://dx.doi.org/10.1016/j.apsusc.2017.07.078>

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One-stage pulsed laser deposition of conductive zinc oxysulfide layers

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Highlights

Zn(O,S) thin films were prepared by one-stage pulsed laser deposition technique.

Conductive Zn(O,S) films were obtained at 200 °C of the substrate temperature.

The band gap value of single phase Zn(O,S) films is around 3.1 eV.

Composition of obtained Zn(O,S) films depends on the substrate temperature.

Abstract

Zinc oxysulfide - Zn(O,S) is one of the prospective materials for substitution of conventional CdS buffer layer in complete optoelectronic devices due to its optimal bandgap and low toxicity. In this work Zn(O,S) thin films have been prepared by one-step pulsed laser deposition technique. The films with a thickness of 650 nm were deposited onto the FTO/glass substrates at different substrate temperatures from room temperature to 400 °C. Zn(O,S) layers were characterized by means of scanning electron microscopy, energy dispersive spectroscopy, Raman, X-ray diffraction, Uv-Vis spectroscopy and Van der Pauw technique. It was found, that obtained Zn(O,S) layers are mainly polycrystalline, highly uniform, transparent, electrically conductive and demonstrate good adhesion to the FTO/glass substrates. In addition, we show

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