

Accepted Manuscript

Title: Efficiency Enhancement of Novel CNTS/ZnS/Zn (O, S) Thin Film Solar Cell

Authors: Yousaf Hameed Khattak, Faisal Baig, Bernabé Marí, Saira Beg, Syed Rizwan Gillani, Salman Ahmed



PII: S0030-4026(18)30800-3
DOI: <https://doi.org/10.1016/j.ijleo.2018.06.001>
Reference: IJLEO 61004

To appear in:

Received date: 12-3-2018
Revised date: 15-5-2018
Accepted date: 1-6-2018

Please cite this article as: Khattak YH, Baig F, Marí B, Beg S, Gillani SR, Ahmed S, Efficiency Enhancement of Novel CNTS/ZnS/Zn (O, S) Thin Film Solar Cell, *Optik* (2018), <https://doi.org/10.1016/j.ijleo.2018.06.001>

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 proof before it is published in its final 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.

Efficiency Enhancement of Novel CNTS/ZnS/Zn (O, S) Thin Film Solar Cell

*Yousaf Hameed Khattak^{1,2}, Faisal Baig^{1,2}, Bernabé Marí¹, Saira Beg³, Syed Rizwan Gillani², Salman Ahmed⁴

¹ETS de Ingeniería de Diseño, Departament de Física Aplicada, Universitat Politècnica de Valencia, Camí de Vera (Spain)

²Department of Electrical Engineering, Federal Urdu University of Arts, Science and Technology Islamabad, (Pakistan)

³COMSATS Institute of Information Technology Islamabad, (Pakistan)

⁴Pakistan Engineering Council Islamabad, (Pakistan)

Corresponding Author: *yousaf.hameedk@gmail.com

Abstract:

$\text{Cu}_2\text{NiSnS}_4$ is non-toxic earth abundant material and a promising quaternary semiconductor compound. It is conspicuous and suitable class of material for the manufacturing of high efficiency, low cost and sustainable thin film photovoltaic cell. A novel structure CNTS/ZnS/Zn(O, S)/FTO is proposed in this work for the efficiency enhancement of CNTS based photovoltaic cell. Up till now there has been no model proposed to use Zn(O, S) as electron transport layer for CNTS based device. In this work we proposed for the first time a novel Zn(O, S) electron transport layer for the efficiency enhancement of CNTS thin film photovoltaic cell. Device modeling is performed on solar cell capacitance simulator (SCAPS) program under 1.5 AM illumination spectrum. Promising optimized functional parameters had been achieved with the conversion efficiency of 17.06%, open circuit voltage (V_{oc}) of 664mV, short-circuit current (J_{sc}) of 31.19 mA/cm² and fill factor (FF) of 82.37%. The above results will give an imperative guideline for the feasible fabrication of high efficiency CNTS based photovoltaic cells.

Keywords:

SCAPS, Solar cell, Efficiency Enhancement, Numerical Analysis, $\text{Cu}_2\text{NiSnS}_4$, CNTS, Zn(O, S)

Download English Version:

<https://daneshyari.com/en/article/7223130>

Download Persian Version:

<https://daneshyari.com/article/7223130>

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