

Accepted Manuscript

Title: A novel optimized double junction CZTS/CIGS solar cell with improved performance: A numerical simulation

Authors: Parisa Karami Moghadam, Mohsen Hayati

PII: S0030-4026(17)31308-6
DOI: <https://doi.org/10.1016/j.ijleo.2017.10.095>
Reference: IJLEO 59831

To appear in:

Received date: 27-7-2017
Accepted date: 20-10-2017

Please cite this article as: Parisa Karami Moghadam, Mohsen Hayati, A novel optimized double junction CZTS/CIGS solar cell with improved performance: A numerical simulation, Optik - International Journal for Light and Electron Optics <https://doi.org/10.1016/j.ijleo.2017.10.095>

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.



A novel optimized double junction CZTS/CIGS solar cell with improved performance: A numerical simulation

Parisa Karami Moghadam, Mohsen Hayati

Electrical Engineering Department, Kermanshah Branch, Islamic Azad University, Kermanshah, Iran.

parisamoghadam_1384@yahoo.com, mohsen_hayati@yahoo.com

Abstract- In this paper, the performance of a double junction solar cell with a novel structure, i.e., made up of two layers of copper zinc tin sulfide (CZTS) & copper indium gallium diselenide (CIGS) and two layers of anti-reflector coatings namely zinc telluride (ZnTe) and cadmium sulfide (CdS) on the top layer of the cell are studied and optimized. To obtain an optimized performance, the effect of CIGS band gap changes on the efficiency is studied. For establishing the current matching in two sub-cells, the effect of thickness of ZnTe and CdS anti-reflectors layers is investigated for optimum short circuit current. The optimized proposed double junction CZTS/CIGS solar cell has an efficiency and fill factor of 45.37 percent and 86.37 percent, respectively.

Keywords: Double junction; Anti-reflector; Current matching; Efficiency; Fill factor

Introduction

Today, the increase of global energy consumption and the environmental pollution caused by fossil fuel consumptions are the greatest problems that endanger the survival of the environment. To decrease the consumption of non-renewable natural resources and malicious fuels for environment, many scientific attempts has been made to reduce the costs of the renewable energy resources production. With the increasing development of technology, the production of electrical energy have been done, using solar spectrum energy; and this energy conversion has been made through the use of the essential property of semiconductors. Among the renewable energy resources, the solar spectrum energy has got a particular importance: because it is easily available, unlimited, and does not pollute the environment. The thin-film solar cells are appropriate and authentic options for production of electrical power and photovoltaic (PV) applications [1-4].

Download English Version:

<https://daneshyari.com/en/article/7225384>

Download Persian Version:

<https://daneshyari.com/article/7225384>

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