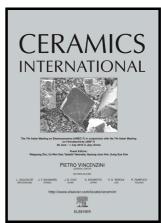
Author's Accepted Manuscript

Photovoltaic performance and impedance spectroscopy of ZnS-Cu-Go nanocomposites

Samia Aslam, Faiza Mustafa, Muhammad Ashfaq Ahmad, Muhammad Saleem, Muhammad Idrees, Arshad Saleem Bhatti



www.elsevier.com/locate/ceri

PII: S0272-8842(17)32121-1

DOI: http://dx.doi.org/10.1016/j.ceramint.2017.09.191

Reference: CERI16362

To appear in: Ceramics International

Received date: 2 August 2017 Revised date: 11 September 2017 Accepted date: 23 September 2017

Cite this article as: Samia Aslam, Faiza Mustafa, Muhammad Ashfaq Ahmad, Muhammad Saleem, Muhammad Idrees and Arshad Saleem Bhatti, Photovoltaic performance and impedance spectroscopy of ZnS-Cu-Go nanocomposites, *Ceramics International*, http://dx.doi.org/10.1016/j.ceramint.2017.09.191

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.

ACCEPTED MANUSCRIPT

Photovoltaic performance and impedance spectroscopy of ZnS-Cu-Go nanocomposites

Samia Aslam, Faiza Mustafa, Muhammad Ashfaq Ahmad, Muhammad Saleem,
Muhammad Idrees, Arshad Saleem Bhatti

Abstract

In this work, novel, non-toxic and cost effective ZnS-Cu-GO nanocomposite is synthesized via wet chemical route to study its photovoltaic properties. Three samples including ZnS ,ZnS-Cu and ZnS-Cu-GO were prepared and deposited as sensitizers on ZnO coated FTO substrates to assemble PV devices. The samples were characterized using UV-Vis NIR spectroscopy, Atomic force microscopy (AFM). Electrochemical impedance spectroscopy (EIS) and AM 1.5 Sun Simulator. It was observed that ZnS-Cu-GO exhibited superior charge transport, remarkably high open circuit voltage (0.8V) and Fill factor (0.806). The current density significantly enhanced and maximum solar cell efficiency was observed for ZnS-Cu-GO based PV device. A pronounced red shift of 360 nm in the absorption spectra was observed in the ZnS-Cu-GO due to fine dispersion of GO sheets. The AFM analysis showed that incorporation of GO and Cu maximized grain density and trench like grain boundaries in ZnS-Cu-GO which facilitated charge transport mechanism. A detailed electrochemical impedance study to probe charge dynamics in the prepared PV devices is presented herein.

Introduction:

A wide topic of interest in research community entails the tailoring of optical and electronic properties of group II-VI semiconductor nanoparticles because of their low cost synthesis, quantum confinement effect and favorable tuning of size controlled band gaps. These attributes make them highly suitable candidates for modern energy devices including photovoltaics and LEDs etc. [1]. ZnS is a group II-VI semiconductor compound which has a wide band gap (3.7eV) and is nontoxic unlike other chalcogenide compounds including cadmium sulfides and selenides etc. It acts as a suitable host crystal lattice structure for various dopants. Many of the researchers have studied metal doped ZnS nanostructures. Another route of modifying the properties of compound semiconductors is to synthesize their hybrids[2-5]. Recently it has been

Download English Version:

https://daneshyari.com/en/article/7889045

Download Persian Version:

https://daneshyari.com/article/7889045

<u>Daneshyari.com</u>