ISSN: 1391-8796
Proceedings of 7th Ruhuna International Science & Technology Conference
University of Ruhuna, Matara, Sri Lanka
January 22, 2020

ZnS buffer layer for CdS/CdTe based solar cells – A preliminary study

Madhuwanthi H.M.L.U.[1], Mahanama G.D.K.[2]* and De Silva D.S.M.[1]

[1]*Department of Chemistry, University of Kelaniya, Kelaniya, Sri Lanka*
[2]*Department of Physics, University of Ruhuna, Matara, Sri Lanka*

Among thin film solar cell materials, cadmium sulphide (CdS) has to been found to be the most suited window material as a heterojunction partner in cadmium telluride (CdTe) based solar cells. By introducing a buffer layer to the heterojunction, the efficiency of the solar cell can be enhanced. The present study focus on identifying optimum conditions for electrodeposition of zinc sulphide (ZnS) buffer layer for CdS/CdTe solar cells. This study revealed that, the electrolytes containing 0.1 mol/L $Na_2S_2O_3$ and 0.1 mol/L $ZnSO_4$ within the pH range of 4.00-4.50 at 30 °C can be used for electrodeposition of ZnS thin films on Florine doped SnO_2 (FTO) coated soda lime glasses at potentials between [(-1000) -(-1200)] mV. The developed materials were characterized using UV-visible spectrophotometry and scanning electron microscopy (SEM) techniques. The optical absorption measurement shows a low light absorbance within the range of (3.60-3.70) eV and SEM studies demonstrate the uniform distribution of ZnS grains on the FTO glass substrate.

Keywords: electrodeposition, zinc sulphide, cadmium sulphide and cadmium telluride

Acknowledgements: We would like to thank the Ministry of Science, Technology and Research for financial assistance through the Prototype Manufacturing of Solar Panels project and National Science Foundation Equipment Grant.

*Corresponding author: mahanama@phy.ruh.ac.lk