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Analysis on the Performance of Copper Indium Gallium Selenide (CIGS) Based Photovoltaic Thermal

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Source

UTP-UMP SYMPOSIUM ON ENERGY SYSTEMS 2015 (SES 2015)
Volume: 38
DOI: 10.1051/matecconf/20163802004

Book Series

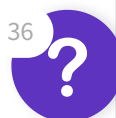
MATEC Web of Conferences

Article Number

02004

Published

2016



Indexed 2016-04-20

Document Type Proceedings Paper

Conference **Meeting:** [UTP-UMP Symposium on Energy Systems \(SES\)](#)
Location: Univ Teknologi Petronas, Perak, MALAYSIA
Date: OCT 07, 2015
Sponsor: UMP

Abstract This paper deals with the efficiency improvement of Copper Indium Gallium Selenide (CIGS) Photovoltaic (PV) and also solar thermal collector. Photovoltaic thermal (PV/T) can improve overall efficiency for PV and also solve the problem of limited roof space at urban area. Objective of this study is to clarify the effect of mass flow rate on the efficiency of the PV/T system. A CIGS solar cell is used with rated output power 65 W and 1.18 m² of area. 4 set of experiments were carried out, which were: thermal collector with 0.12 kg/s flow rate, PV/T with 0.12 kg/s flow rate, PV/T with 0.09 kg/s flow rate and PV. It was found that PV/T with 0.12 kg/s flow rate had the highest electrical efficiency, 2.92 %. PV/T with 0.09 kg/s flow rate had the lowest electrical efficiency, 2.68 %. It also had 2 % higher overall efficiency. The efficiency gained is low due to several factors. The rated output power of the PV is low for the area of 1.18 m². The packing factor of the PV also need to be considered as it may not be operated at the optimal packing factor. Furthermore, aluminium sheet of the PV may affect the PV temperature due to high thermal conductivity. Further study on more values of mass flow rate and also other parameters that affect the efficiency of the PV/T is necessary.

Keywords **Keywords Plus:** [HEATING-SYSTEM](#); [COLLECTORS](#)

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Categories/ Classification Research Areas: Energy & Fuels; Materials Science
Citation [4 Electrical Engineering](#), [4.18 Power](#) [4.18.575](#)
Topics: [Electronics & Computer Science](#) › [Systems & Electric Vehicles](#) › [Photovoltaic Systems](#) 36
Sustainable Development Goals: [07 Affordable and Clean Energy](#)

+ See more data fields

Journal information

UTP-UMP SYMPOSIUM ON ENERGY SYSTEMS 2015 (SES 2015)

ISSN 2261-236X

Current Publisher E D P SCIENCES, 17 AVE DU HOGGAR PARC D ACTIVITES
COUTABOEUF BP 112, F-91944 CEDEX A, FRANCE

Research Areas Energy & Fuels; Materials Science

Web of Science Categories Energy & Fuels; Materials Science, Multidisciplinary

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