

# Accepted Manuscript

Heat dissipation characteristics from photovoltaic cells within the partitioned or non-partitioned glazed cavity to the windy environment

Ying-Ying Wu, Shuang-Ying Wu, Lan Xiao



PII: S0960-1481(18)30516-0

DOI: [10.1016/j.renene.2018.04.091](https://doi.org/10.1016/j.renene.2018.04.091)

Reference: RENE 10049

To appear in: *Renewable Energy*

Received Date: 5 December 2017

Revised Date: 19 March 2018

Accepted Date: 30 April 2018

Please cite this article as: Wu Y-Y, Wu S-Y, Xiao L, Heat dissipation characteristics from photovoltaic cells within the partitioned or non-partitioned glazed cavity to the windy environment, *Renewable Energy* (2018), doi: 10.1016/j.renene.2018.04.091.

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.

# Heat dissipation characteristics from photovoltaic cells within the partitioned or non-partitioned glazed cavity to the windy environment

Ying-Ying Wu<sup>b</sup>, Shuang-Ying Wu<sup>a,b,\*</sup>, Lan Xiao<sup>a,b</sup>

<sup>a</sup>Key Laboratory of Low-grade Energy Utilization Technologies and Systems, Ministry of Education, Chongqing University, Chongqing 400044, China;

<sup>b</sup>College of Power Engineering, Chongqing University, Chongqing 400044, China)

**Abstract:** A numerical model, whose computation domain contains the glazed shallow cavity and surrounding wind field, has been proposed to investigate the characteristics of heat dissipation from photovoltaic cells within the glazed cavity to the windy environment. To reflect the actual working characteristics, both the photoelectric conversion characteristic and surface radiation were considered. The temperature distribution of PV cells particularly the hot spot temperature has been displayed to reveal the effect of tilt angle ( $\alpha$ ) and wind velocity ( $v$ ). Then a thorough analysis was presented in virtue of visualized results, convection Nusselt number inside the cavity ( $Nu_{cin}$ ) and total heat loss coefficient ( $U_t$ ). Meanwhile, efforts were also performed to compare the partitioned and non-partitioned cavities. Results show that hot spot position at  $\alpha=15^\circ$  has the obvious diversity due to the variation of wind velocity. Unlike the increased  $Nu_{cin}$ , total heat loss coefficient of PV cells at  $v=5\text{m/s}$  decreases when the tilt angle shifts from  $15^\circ$  to  $30^\circ$ . Further, it is found that hot spot temperature difference between the three cells shrinks in the partitioned cavity, and the partition indeed contributes to the improvement of PV cells temperature uniformity, which plays a positive role in the protection of PV cell property.

**Keywords:** glazed cavity; surrounding wind; partition; PV cells temperature; hot spot; heat loss

\*Corresponding author. Tel.: +86-(0)13657693789; fax: +86-23-65102473.  
E-mail address: shuangyingwu@126.com

Download English Version:

<https://daneshyari.com/en/article/6764140>

Download Persian Version:

<https://daneshyari.com/article/6764140>

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