Accepted Manuscript

Research Paper

A study on exergetic performance of using porous media in the salt gradient solar pond

Hua Wang, Qi Wu, Yanyang Mei, Liugang Zhang, Shusheng Pang

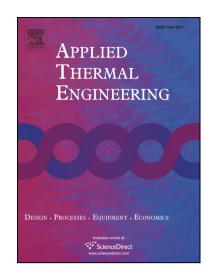
PII: S1359-4311(17)37663-9

DOI: https://doi.org/10.1016/j.applthermaleng.2018.03.025

Reference: ATE 11913

To appear in: Applied Thermal Engineering

Received Date: 1 December 2017 Revised Date: 26 January 2018 Accepted Date: 6 March 2018



Please cite this article as: H. Wang, Q. Wu, Y. Mei, L. Zhang, S. Pang, A study on exergetic performance of using porous media in the salt gradient solar pond, *Applied Thermal Engineering* (2018), doi: https://doi.org/10.1016/j.applthermaleng.2018.03.025

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.

CCEPTED MANUSCRIPT

A study on exergetic performance of using porous media in the salt

gradient solar pond

Hua Wang¹, Qi Wu¹, Yanyang Mei^{1,*}, Liugang Zhang¹ Shusheng Pang²

1. School of Mechanical and Power Engineering, Henan Polytechnic University,

2001 Century Avenue, Jiaozuo 454003, Henan, P. R. China

2. Department of Chemical and Process Engineering, University of Canterbury, Christchurch, 8025,

New Zealand

Abstract: The transient exergetic performance of the salt gradient solar ponds with porous

media added in Lower Convective Zone (LCZ) is investigated. One dimensional transient

temperature, energy and exergy models have been developed. Three different porous media

materials have been used in the simulation. Findings show that solar pond with cinders gains

the highest LCZ temperature and gets the maximum energy and exergy efficiency which are

32.62 % and 20.70 % respectively, and the lowest one is the case with marbles which are

29.72% and 16.62%. The results indicate that adding porous media with low volume heat

capacity and low heat diffusivity to LCZ is beneficial to reach a higher temperature, and high

temperature, high volume heat capacity and low thermal diffusivity of the porous media are

both positive effect to the solar pond's energy and exergy storage. Experimental study shows

that the numerical energy and exergetic efficiency are both a little higher than experimental

ones, and the same temperature difference leads to a bigger exergy difference than energy.

Key words: solar pond; porous media; exergy; energy; simulation

1. Introduction

China government has set the target of increasing the share of renewable energy

Corresponding author.

E-mail address: 1987myy525@163.com

1

Download English Version:

https://daneshyari.com/en/article/7045577

Download Persian Version:

https://daneshyari.com/article/7045577

<u>Daneshyari.com</u>