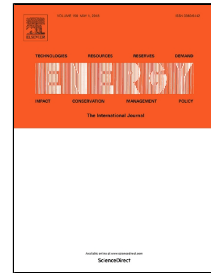


Accepted Manuscript

Comparative analysis of different surfaces for integrated solar heating and radiative cooling: A numerical study

Mingke Hu, Bin Zhao, Xianze Ao, Yuehong Su, Yunyun Wang, Gang Pei



PII: S0360-5442(18)30768-0
DOI: 10.1016/j.energy.2018.04.152
Reference: EGY 12791
To appear in: *Energy*
Received Date: 17 October 2017
Revised Date: 23 March 2018
Accepted Date: 25 April 2018

Please cite this article as: Mingke Hu, Bin Zhao, Xianze Ao, Yuehong Su, Yunyun Wang, Gang Pei, Comparative analysis of different surfaces for integrated solar heating and radiative cooling: A numerical study, *Energy* (2018), doi: 10.1016/j.energy.2018.04.152

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.

Comparative analysis of different surfaces for integrated solar heating and radiative cooling: A numerical study

Mingke Hu ^a, Bin Zhao ^a, Xianze Ao ^a, Yuehong Su ^b, Yunyun Wang ^{a, c}, Gang Pei ^{a, *}

^a Department of Thermal Science and Energy Engineering, University of Science and Technology of China, Hefei 230027, China

^b Institute of Sustainable Energy Technology, University of Nottingham, University Park, Nottingham NG7 2RD, UK

^c Key Laboratory of Optoelectronic Devices and Systems of Ministry of Education and Guangdong Province, College of Optoelectronic Engineering, Shenzhen University, Shenzhen 518060, China

* Corresponding author. 0551-63601652. peigang@ustc.edu.cn

Abstract

The spectral selectivity of solar selective absorbing coatings enhances coating performance in diurnal heating collection but also limits the potential application of these materials in nocturnal radiative cooling. A radiative cooling surface shows poor solar heating performance due to the same reason. The present study proposed a novel surface that combines solar heating and radiative cooling (SH-RC) considering the spectral selectivity of photo-thermic conversion and radiative cooling. A hypothetical SH-RC surface was also proposed. This hypothetical surface had an absorptivity of 0.92 in the solar radiation band, emissivity of 0.70 in the “atmospheric window” band, and absorptivity (emissivity) of 0.05 in other bands. The thermal performance of this spectrally selective SH-RC surface (SH-RC_s surface) was numerically investigated by comparing it with three surfaces, namely, solar selective absorbing coating surface (SH surface), spectrally selective radiative cooling surface (RC surface), and spectrally non-selective black surface (SH-RC_{black} surface). Results indicated that

Download English Version:

<https://daneshyari.com/en/article/8071433>

Download Persian Version:

<https://daneshyari.com/article/8071433>

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