

## Accepted Manuscript

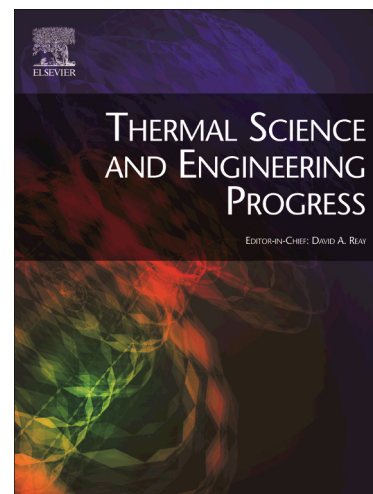
### Solar Energy Latent Thermal Storage by Phase Change Materials (PCMs) in a Honeycomb System

Assunta Andreozzi, Bernardo Buonomo, Davide Ercole, Oronzio Manca

PII: S2451-9049(17)30371-2  
DOI: <https://doi.org/10.1016/j.tsep.2018.02.003>  
Reference: TSEP 131

To appear in: *Thermal Science and Engineering Progress*

Received Date: 15 October 2017  
Revised Date: 4 February 2018  
Accepted Date: 4 February 2018



Please cite this article as: A. Andreozzi, B. Buonomo, D. Ercole, O. Manca, Solar Energy Latent Thermal Storage by Phase Change Materials (PCMs) in a Honeycomb System, *Thermal Science and Engineering Progress* (2018), doi: <https://doi.org/10.1016/j.tsep.2018.02.003>

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.

## Solar Energy Latent Thermal Storage by Phase Change Materials (PCMs) in a Honeycomb System

Assunta Andreozzi<sup>1\*</sup>, Bernardo Buonomo<sup>2</sup>, Davide Ercole<sup>2\*</sup>, Oronzio Manca<sup>2</sup>

<sup>1</sup> *Dipartimento di Ingegneria Industriale, Università degli Studi di Napoli Federico II, Piazzale Tecchio, 80, 81025 (Napoli, Italy)*

<sup>\*2</sup> *Università degli Studi della Campania, “Luigi Vanvitelli”, Dipartimento di Ingegneria Industriale e dell’Informazione, Via Roma, 29, 81031 (Aversa, Italy)*

**Abstract:** A computational investigation of a honeycomb system with Phase Change Materials (PCM) for solar energy applications is accomplished. The system is a solid honeycomb structure made in checkerboard matrix using parallel squared channels, half of them are filled with PCM and in the other the Heat Transfer Fluid (HTF) passes through. Transient regime numerical simulations are created for different channels per unit of length (CPL). The Solid-liquid PCM is paraffin wax. A comparison between the direct honeycomb model (Model A) and a porous medium model (Model B) is carried out. The model B is modelled with the extended Darcy-Brinkman law using the Local Thermal Equilibrium (LTE) assumption for heat exchange between solid and liquid zones. By the results of the direct honeycomb model, the characteristics such as permeability, effective thermal conductivity and interfacial heat transfer are evaluated and then compared with the porous medium model. Numerical simulations were carried out using the Ansys-Fluent code. Results in terms of melting time and temperature fields as function of time are presented.

**\* Corresponding author: Davide Ercole, [davide.ercole@unicampania.it](mailto:davide.ercole@unicampania.it)**

**Keywords:** Thermal storage; PCM; Phase Change material; Porous media; Honeycomb; Darcy-Brinkman law.

Download English Version:

<https://daneshyari.com/en/article/8918705>

Download Persian Version:

<https://daneshyari.com/article/8918705>

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