

Accepted Manuscript

Research Paper

An innovative practical battery thermal management system based on phase change materials: Numerical and experimental investigations

Amine Lazrak, Jean-François Fourmigué, Jean-François Robin

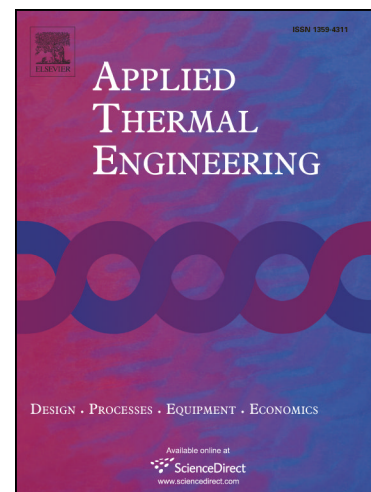
PII: S1359-4311(17)31573-9
DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2017.08.172>
Reference: ATE 11055

To appear in: *Applied Thermal Engineering*

Received Date: 7 March 2017
Revised Date: 21 July 2017
Accepted Date: 31 August 2017

Please cite this article as: A. Lazrak, J-F. Fourmigué, J-F. Robin, An innovative practical battery thermal management system based on phase change materials: Numerical and experimental investigations, *Applied Thermal Engineering* (2017), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2017.08.172>

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.



An innovative practical battery thermal management system based on phase change materials: Numerical and experimental investigations

Amine Lazrak^a, Jean-François Fourmigué^b, Jean-François Robin^b

^a Concordia University, Department of building civil and environmental engineering, Montreal, Canada

^b CEA, LITEN, INES, Le Bourget du Lac, France

Corresponding Author: Lazrak.amine@yahoo.com

ABSTRACT

The market of electric vehicles still faces some impediment to its optimal development. Electric batteries play an important role in this context since they are the key element in an electric vehicle (EV). Improving the energy performance of batteries will certainly improve the autonomy and reliability of EVs and thus their market penetration. To achieve this objective, battery thermal management systems are necessary to keep the temperature below security limits and make the temperature distribution as uniform as possible inside the battery pack and its cells. In this paper, a new solution to integrate and improve the thermal heat transfer of a phase change material (PCM) inside a battery thermal management system (BTMS) is proposed and the effect of the PCM melting temperature on the system performance is investigated. Two numerical models have been built and their results were the input of a small size PCM-based BTMS prototype development. Experimental results showed that the novel system was able to reduce the system temperature by at least 5°C, compared to the reference, upon completion of the phase change process inside the PCM.

KEYWORDS

Thermal management, Electric battery, Phase change material, Modelling, System development, System testing.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات