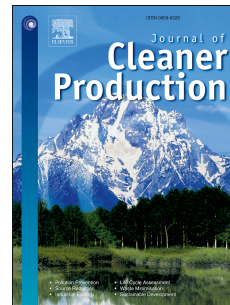


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Experimental investigation on thermal management performance of electric vehicle power battery using composite phase change material

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1     **Experimental Investigation on Thermal Management Performance of Electric**  
2             **Vehicle Power Battery Using Composite Phase Change Material<sup>1</sup>**

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7     **Abstract:** The development of electric vehicles (EVs) is beneficial to a cleaner  
8     environment. As the powertrain of EVs, power battery is limited obviously by its fast  
9     operating temperature rise and large temperature variation among different parts, so  
10    an efficient battery thermal management (BTM) system is desirable. In this paper, a  
11    battery thermal management system using kaolin/expanded graphite (EG)/paraffin  
12    composite was designed. By contrasting different thermal properties of ternary  
13    composites with various proportions, the most suitable composite with 10wt.% EG  
14    and 10wt.% kaolin was selected for the thermal management testing, which has a  
15    conductivity of larger than 6 W/(m • K) and did not shows any visible leakage after 30  
16    min at 60°C. In the thermal management test, the temperature of a single battery was  
17    effectively controlled under 45°C even at the discharge rate of 4C, and the  
18    temperature difference of the single battery was restrained within 5°C. Besides, the  
19    composite had reduced the temperature of the battery pack by 25.77% at 4C rate, and  
20    the temperature difference of the battery pack or each battery in the pack could be  
21    greatly controlled once the phase change occurred. In conclusion, the excellent  
22    temperature controlling performance of the new phase change material (PCM) was

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The short version of the paper was presented at ICEEE2017/ISEV2017 on July 26-29, Sweden.

This paper is a substantial extension of the short version of the conference paper.

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