ContainerPower Energy Solutions

Pack battery heat dissipation

Overview

Heat out of pack is a simple P=RI^2 equation. You know the current out of each cell, and you know (or should be able to find out) the internal resistance of each cell.What happens if a battery pack is heated?

The heat generated affects the adjacent cells, which are subjected to the same occurrence. This chain reaction not only increases the battery pack temperature but releases many flammable gases, which increase the internal pressure of the pack and cause potential explosion and fire of the EV powertrain .

Does battery arrangement affect the thermal performance of a battery pack?

Here, a multiscale method combining a pseudo-two-dimensional model of individual battery and three-dimensional computational fluid dynamics is employed to describe heat generation and transfer in a battery pack. The effect of battery arrangement on the thermal performance of battery packs is investigated.

Can nano-carbon-based phase change materials improve heat dissipation in a 16-cell lithium-ion battery pack?

This study presents a comprehensive thermal analysis of a 16-cell lithium-ion battery pack by exploring seven geometric configurations under airflow speeds ranging from 0 to 15 m/s and integrating nano-carbon-based phase change materials (PCMs) to enhance heat dissipation.

How hot does a battery pack get?

Across four distinct ambient temperature scenarios, the battery pack exhibits natural heat dissipation ranging from 7.9 to 5.6 °C at its highest and lowest temperatures, respectively. Notably, a higher ambient temperature results in a narrower temperature difference within the battery pack.

What are the disadvantages of a battery pack?

The main disadvantage is the additional thermal resistance of the external case ; Indirect heat exchange: the heat exchange is realised using an interface between the battery pack surface and the liquid fluid. This interface can be a cooling plate, distinct piping, or jackets.

How to evaluate thermal performance of a battery pack?

It is important to evaluate thermal performance of a battery pack in designing process. Here, a multiscale method combining a pseudo-two-dimensional model of individual battery and three-dimensional computational fluid dynamics is employed to describe heat generation and transfer in a battery pack.

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