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# Fast-charging lithium battery pack

## Overview

Can a fast charging method reduce lithium plating risks?

Yang et al. introduced a fast charging method for a 6P1S (six-parallel) battery model based on a thermal and aging coupled single particle model (SPM) to mitigate lithium plating risks. Their study further explored the impact of branch and interconnect resistances on module performance.

What is a fast-charging battery?

The United States Advanced Battery Consortium (USABC) proposed the metrics for fast-charging batteries for EV applications which is to achieve 80 % state of charge (SOC) within 15 min corresponding to a charging rate of 4C , , .

Can a fast charging strategy avoid lithium deposition?

A fast charging strategy for packs to avoiding lithium deposition is proposed. The model and method are validated through both experiments and simulations. The impacts of branch resistance on charging performance are investigated. The method undergoes a real-world electric vehicle testing with 276 cells.

Can fast-charging improve battery safety & lifespan?

Existing fast-charging protocols, such as CC-CV, MCC, and pulse charging strategies, have made notable progress in improving charging efficiency and reducing charging time. However, balancing charging speed with battery safety and lifespan remains a significant challenge.

Why is material design important for fast-charging lithium-ion batteries?

Material design is essential to optimize the fast-charging performance. With the expansion of electric vehicles (EVs) industry, developing fast-charging lithium (Li)-ion batteries (LIBs) is highly required to eliminate the charging anxiety and range anxiety of consumers.

What does fast charging mean?

Fast charging means cathodic load. Hence, lithium is removed from the cathode and plated at the anode side. Ideally, this process produces a homogeneous and even surface. However, high current densities, which are a feature of fast charging, often result in inhomogeneous Li deposition and dendrite formation takes place.

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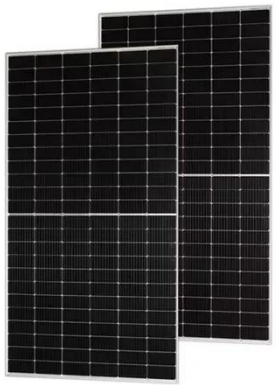
### Balancing Awareness Fast Charging Control for Lithium-Ion Battery Pack

May 16, 2023 · Minimizing charging time without damaging the batteries is significantly crucial for the large-scale penetration of electric vehicles. However, charging inconsi

### Optimal fast charging strategy for series-parallel configured lithium

Jan 1, 2025 · Leveraging the derived battery pack model, we introduce a refined online fast charging framework that mitigates lithium deposition. Fig. 3 outlines the architecture and ...



### Numerical investigation of the direct liquid cooling of a fast-charging

Sep 1, 2021 · A fast-charging battery pack with DLC is designed for an electric sport utility vehicle (SUV). The basic characteristics of the electric SUV and battery pack are displayed in Table 1, ...

## Recent advances in fast-charging lithium-ion batteries: ...

Jan 15, 2025 · With the expansion of electric vehicles (EVs) industry, developing fast-charging lithium (Li)-ion batteries (LIBs) is highly required to eliminate the charging anxiety and range ...

## Experimental investigations of liquid immersion cooling for ...

Jun 5, 2023 · Effects of condenser flow rate and cooling water temperature were investigated for the system. In this study, a novel battery thermal management system (BTMS) based on FS49 ...

## A new method to perform lithium-ion battery pack fault ...

Aug 30, 2023 · On the other hand, fast charging of eVTOL batteries is crucial to enable multiple flights per day and justify the economics of UAM. This work is aimed at contextualising battery ...

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