

# **Overcharge of the three-stage energy storage device**





## Overview

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What are the three stages of a Lib overcharging experiment?

The entire overcharging experiment can be divided into three stages based on the variations in the physical properties, voltage, and temperature of LIBs: Stage I (early thermal runaway), Stage II (middle thermal runaway), and Stage III (late thermal runaway).

How are overcharge and overdischarge induced thermal runaway processes analyzed?

Based on the temperature-voltage behavior and induced thermal runaway (TR) mechanisms, the overcharge and overdischarge-triggered TR processes are divided into four and three stages. Furthermore, the degradation effect is analyzed by analyzing the incremental capacity-differential voltage curves.

Do batteries have thermal runaway risk during overcharge?

The study systematically evaluated the thermal runaway risk of these batteries under overcharge conditions of 10 V-3 A low current and 10 V-6 A high current. After the overcharge experiments, the batteries were disassembled to analyze the performance of their thermal runaway protection mechanisms during overcharging.

How do overcharge protection devices prevent thermal runaway?

At lower charging rates, the overcharge protection devices can more effectively prevent thermal runaway, because the side reactions are relatively mild, and CID or PTC can promptly cut off the current and effectively prevent combustion and explosion.



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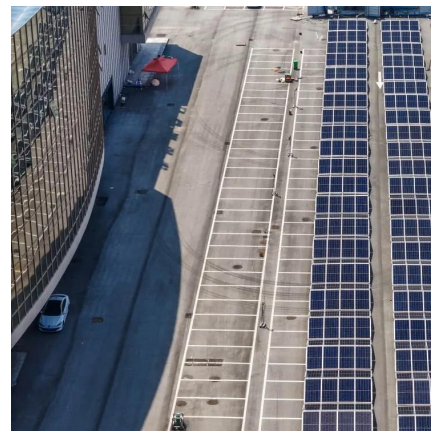
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