SolarInnovate Energy Solutions

Cylindrical lithium battery over discharge

Overview

Why do lithium ion batteries overcharge?

Lithium-ion battery (LIB) cells are prone to overdischarge or overcharge when connected in series or parallel as a module or pack for large-format applications, such as electric vehicles (EVs) because of variations in battery capacities and difficulty in maintaining similar state-of-charge (SOC) of every single battery.

How does a lithium battery degrade during a high current cycling process?

Furthermore, the degradation effect is analyzed by analyzing the incremental capacity-differential voltage curves. During the high current cycling process, lithium inventory decreases significantly. Besides, the active material decreases when the battery degrades to a certain level.

Can a lithium ion battery fail if overcharged?

indicated that the LIB could fail when it was over-discharged above a critical degree. Fig. 10 shows several typical moments during the burning process of LIB a ected by a 2 kW power electric heater. The batteries were the ones experiencing failure induced by 2C overcharge/over-discharge. The batteries were placed upon the supporting mesh.

What is the state of health of batteries after over-discharge cycling?

The cathode materials and anode materials after over-discharge cycling are characterized by SEM technology. Finally, the state of health (SOH) of batteries were estimated based on the IC peak, lithium-ion diffusion time constant and relaxation voltage curve characteristic.

Does overcharged lithium ion battery burn longer?

Compared to the fire behaviors of the overcharged LIB, much moderate fire behaviors were observed for the failed LIB due to over-discharge, and it took more time to be ignited. Therefore, the burning process of the over-

discharged LIB lasted much longer.

What happens when a battery is charged/discharged?

As described in Equation (4), when the battery cells are charged/discharged with large current rates, rapid heat generation quickly reaches the SEI film decomposition temperature, which induces the chain thermal-electrochemical reactions, finally triggering TR.

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Effect of Over-Discharge Depths on Battery Performance Over ...

Oct 27, 2024 · As the inconsistency of the battery module deteriorates, some cells are highly susceptible to over-discharge. In this study, the effects of depth of over-discharge (DoOD) on ...

Investigating thermal dynamics in cylindrical Li-ion batteries ...

5 days ago · Thermal dynamics in cylindrical Li-ion batteries, governed by electrochemical heat generation, are critical to performance and safety in high-power applications such as electric ...

Overcharge behaviors and failure mechanism of lithium-ion batteries

Sep 15, 2019 · The safety problems of lithium-ion batteries can be induced under abusive conditions [3], which can be categorized into mechanical abuse (crush [6], [7], penetration [8], ...

Examination of Over-Discharge Effects on a Cylindrical Lithium ...

May 28, 2025 · Li-ion battery recycling is growing with better tech and eco-awareness. Explosions are possible during battery recycling due to their residual voltage. Proper battery discharge is ...

Effects of short-term over-discharge cycling on the ...

Mar 1, 2021 · The loss of Li inventory related to the decomposition and reformation of solid electrolyte interphase film is an important cause of the irreversible capacity loss/degradation of ...

Thermal modeling of cylindrical lithium ion battery during discharge

Aug 1, 2011 · The cylindrical Li-ion battery was simulated to provide thermal behavior during discharge cycle. The transient model developed a set of energy equations considering heat ...

A Comparative Study on

Prismatic and Cylindrical Lithium-Ion Batteries

Jan 26, 2022 · The study presented concentrates on the thermal performance of prismatic and cylindrical lithium-ion batteries at different discharge rates. Lithium-ion batteries possess the ...

Modeling the Effect of Over-discharge Cycling on Li-ion Batteries

Jun 4, 2025 · Off-nominal circumstances inducing cell over-discharge in a battery are of concern due to electrolyte decomposition and prolonged degradation effects. Copper dissolution and its ...

Aging mechanisms of cylindrical NCA/Si-graphite battery ...

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...

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Optimization of fast-charging strategy for LISHEN 4695 cylindrical

Feb 15, 2025 · Abstract Developing fast-charging technology for lithium-ion batteries with high energy density remains a significant and unresolved challenge. Fortunately, the advent of the ...

Investigation of a commercial lithium-ion battery under overcharge/over

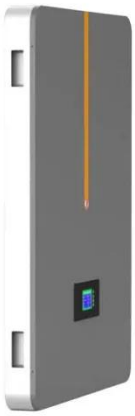
A lithium-ion battery (LIB) may experience overcharge or over-discharge when it is used in a battery pack because of capacity variation of different batteries in the pack and the difficulty of ...

Overdischarge-induced evolution of Cu dendrites and ...

Mar 1, 2023 · Wang et al. conducted electrochemical tests on overdischarge cycle batteries with different depths of discharge (DODs) and proved that the loss of lithium and the loss of active ...

Experimental and simulation study of direct current ...

Oct 10, 2023 · Understanding the contribution of internal direct current resistance (DCR) is crucial to the design and optimization of lithium-ion batteries (LIBs). However, the complex dynamic ...



Degradation Analysis of 18650 Cylindrical Lithium-Ion Batteries ...

Mar 3, 2025 · Abstract: Analyzing the degradation behavior of lithium-ion batteries under specific operating conditions is essential. This paper carried out non-destructive analysis and ...

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