

Does current rate affect the degradation behavior of a lithium-ion battery?

To gain a better insight into over-discharge behavior, an experimental study is carried out in the present work to investigate the impact of current rate, i.e. cycle rate, charge rate and discharge rate on the degradation behavior of a lithium-ion battery under over-discharge condition.

Does cycle rate affect degradation behavior of lithium-ion batteries during over-discharge cycling?

After the over-discharge cycling, the batteries discussed in Impact of cycle rate on the degradation behavior of lithium-ion battery during over-discharge cycling Section were resumed with normal cycling, that is, they were cycled between 2.75-4.2 V at a rate of 0.5, 1, 2 and 3C, respectively.

What is the discharge capacity of a lithium ion battery?

Combining the results in The electro-thermal behaviors of the over-discharged lithium-ion batteries in combination with different current rates Section, it can be found that when a battery is over-discharged to 0.5 V at a rate of 0.5C, its discharge capacity is obtained at 1222 mAh.

What is the capacity loss of a lithium ion battery?

By the end of 100th cycle, the total capacity loss is 7%, 8%, and 10% for 1.5 V, 1.0 V, and 0.5 V over-discharged voltages, respectively. The capacity degradation of LIBs is increased with the augment of over-discharge level. Moreover, the lifetime of the cell is greatly reduced under 0.0 V over-discharge.

Are lithium-ion batteries over-discharged?

With the popularity of lithium-ion batteries, especially the widespread use of battery packs, the phenomenon of over-discharge may be common.

Why do lithium ion batteries need to be charged and discharged?

Heat generation is a crucial factor for lithium-ion batteries during the charge and discharge process, which can trigger serious safety issues such as fire hazard and explosion. Over-discharge is a common inducement which can result in not only heat generation effect, but electrode and electrolyte failure.

This review highlights the crucial role of over-discharge and zero-volt protection in LIBs, elucidates the damage mechanisms to Cu current collectors and SEI during over-discharge, summarizes existing protection strategies based on electrode zero-crossing potentials, and offers new insights into cathode prelithiation additive material design ...

Moreover, lithium-ion batteries are simply more efficient than lead-acid batteries, which means that more solar power can be stored and used in lithium-ion batteries. Lead-acid batteries are only 80%-85% efficient, depending on the model and condition. This means that if there are 1,000 watts of solar coming into the

batteries, there are only 800--850 watts available after the ...

Lithium-ion batteries connected in series are prone to be overdischarged. Overdischarge results in various side effects, such as capacity degradation and internal short circuit (ISCr). However ...

Here, we propose an over-discharge strategy to understand the mechanism of heat generation and battery failure. 36 Ah pouch-type battery is charged at 1C (36 A) current density, and is discharged for 1.5 h at 1C (36 A) with 0.5 h over-discharge degree.

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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 maintaining identical state of charge (SOC) of every single battery. A series of experiments were established to investigat

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