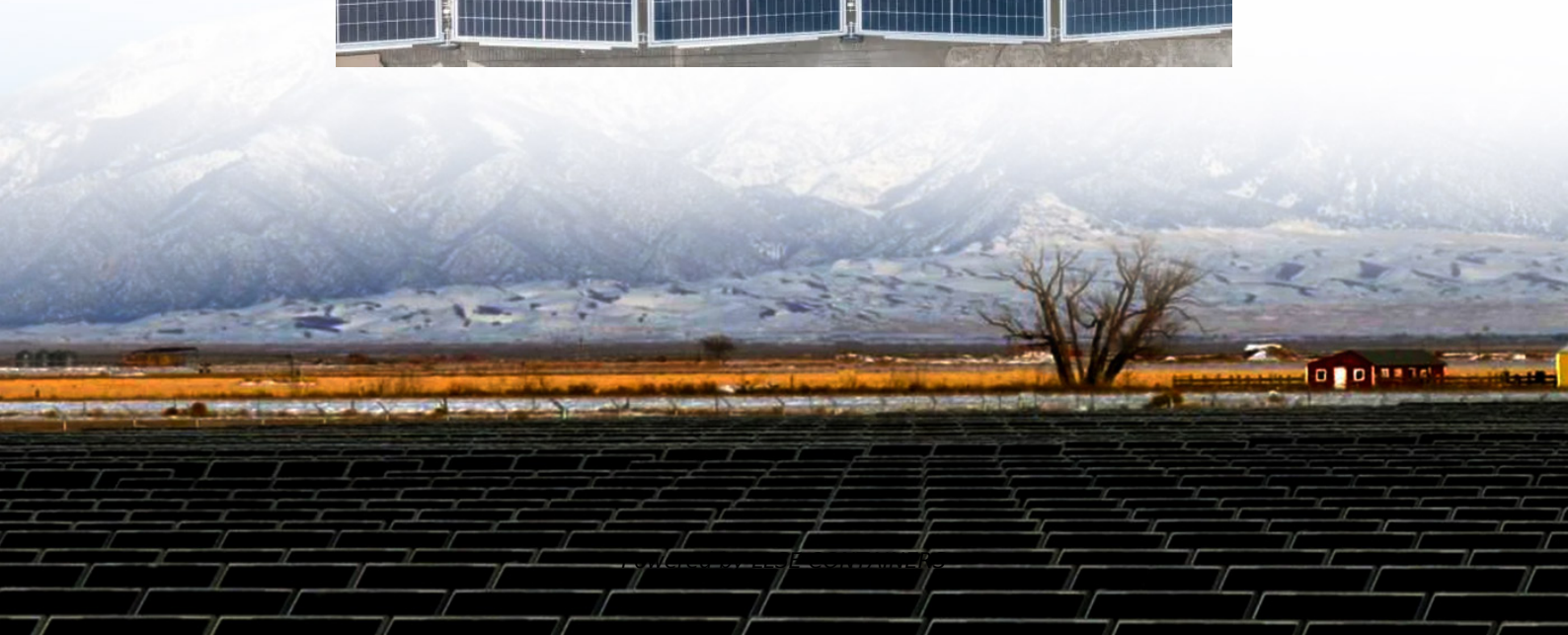


# High current discharge of tool batteries





## Overview

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What causes battery aging under high-rate discharge conditions?

Electrochemical-thermal-aging coupled model As previously mentioned, the primary causes of battery aging under high-rate discharge conditions are the dissolution of the cathode current collector, particle fracture, and the deposition of  $Al^{3+}$  on the anode. However, existing studies lack a detailed mathematical description of these aging mechanisms.

What temperature should a battery be discharged at?

Under 1C, 2C, and 3C discharge conditions, the maximum temperatures of the battery are 35 °C, 45 °C, and 70 °C, respectively. Elevated temperatures promote the decomposition of the electrolyte, corrosion of the cathode current collector, and the deposition of  $Al^{3+}$  on the anode.

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.

Does overcharge cause thermal runaway behavior of battery cells?

Besides, the thermal runaway behavior of the aged battery cells induced by slight overcharge is analyzed. This study comprehensively explains various side reaction effects on the battery thermal characteristic. It guides the safety design and management of Li-ion batteries during their lifespan in real applications.



## High current discharge of tool batteries

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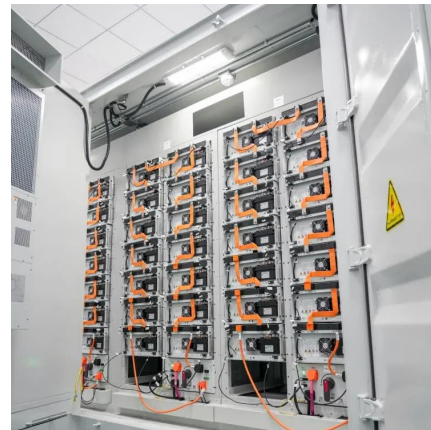


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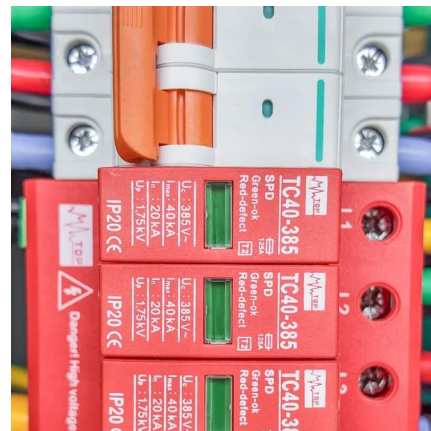
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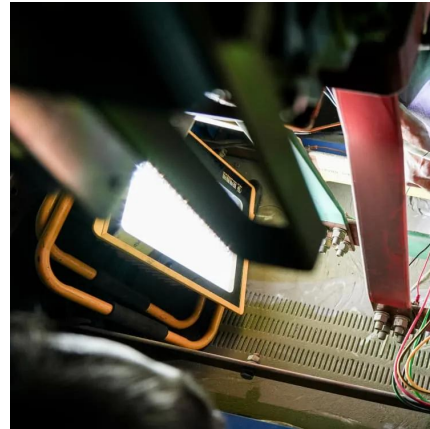
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