

## Analysis of the Temperature Change of a Single Battery Based on Simulink

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A single battery is the smallest unit of the power source of an electric vehicle. Research on the heat production of a single battery can inform the more precise control the temperature distribution of the entire battery pack. This article selects a certain 18650 lithium-ion battery as the research object. We analyze the working principle, heat production and heat transfer of the battery. Then, we define the basic parameters and establish a heat production model of the single battery. The change in internal resistance of the lithium-ion battery is caused by the state of charge and external temperature. Through its transformation relationship, the impact on the battery temperature is studied. A thermal model of a concentrated mass battery with natural heat dissipation is generated through Simulink to simulate the same temperature at different battery discharge rates and the same battery discharge rate at different temperatures. This method provides a new concept for battery simulation. The temperature increase accelerates at the end of the constant current discharge. When the external temperature increases, the maximum temperature increase of the lithium-ion battery gradually decreases.

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**Keywords:** 18650 battery; Thermal model; Simulink; Temperature; Simulation analysis

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