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Abstract

The LiNi_{0.8}Mn_{0.1}Co_{0.1}O₂/Silicon-carbon lithium ion battery is used in the plug-in electric vehicle due to its high specific energy. The mileage of electric vehicles can be improved by increasing the energy density of batteries, but the charging process becomes a more challenge issue since the excessive charging current results in high temperature while the thermal stability of NCM811 material is poor. Also, the increasing of temperature may cause the thermal runaway of lithium ion battery. In this work, in order to study the thermal runaway prevention during charging process, the NCM811/Si@C battery model is set up, and the simulation results are verified by the experimental results. Based on the thermal runaway data, the maximum safe charge current under different ambient temperature is predicted, and the relationship between maximum safe charging current and ambient temperature is found.

Figures used in the abstract

Figure 1: 最大充电电流与环境温度关系