

Parametric Study on Water-Cooling Plates to Improve Cooling Performance on 18650 Li-Ion Battery

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Abstract : In this study, the effect of channel geometry and operating circumstances on a liquid cooling plate for Lithium-ion Battery modules has been investigated. Inlet temperature, water velocity, and channel count were the main factors. According to the passage, enhancing the number of cooling channels [2,3,4,6 channels per base] will affect water flow distribution caused by varying the velocity inlet inside the cooling block [0.5, 1.0, 1.5, 2.0 m/sec] and intake temperatures [25, 30, 35, 40 °C]. The findings indicate that the battery's temperature drops as the number of channels increases. The maximum battery's operating temperature [45 °C] rises, but Δt is needed to be less than 5 °C [$v \leq 1$ m/sec]. Maximum temperature and local temperature difference of the battery change significantly with the change of the velocity inlet in the cooling channel and its thermal conductivity. The results of the simulation will help to increase cooling efficiency on the cooling system for Li-ion Battery based on a Mini channel in a liquid-cooling configuration.

Keywords : cooling efficiency, channel count, lithium-ion battery, operating

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