

## Computational Fluid Dynamics Based Optimal Design of Microchannel Geometry in Liquid Cooling System of Lithium-ion Battery

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The Lithium-ion (Li-ion) battery has widely applied to electric vehicles and hybrid electric vehicles because of its performance such as high energy density and low self-discharging rate. However, fire and explosions can be triggered by thermally improper operation of Li-ion battery. To relieve this situation, efficient battery cooling system is essential for battery thermal management. This paper proposes microchannel geometry of liquid cooling system of the Li-ion battery at battery module. Case studies with computational fluid dynamics (CFD) are carried out where the height and width of the one microchannel is the main geometric variables. Its design is optimized using artificial neural network model (ANN). Nail penetration is employed to estimate the thermal safety. The temperature distribution and the maximum temperature are analysed and the results are compared with the other microchannel cooling systems.