

Thermal Management of LiO Power Battery Systems for EV and HEV using Micorchannel Cooling Design

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Safety and performance concern of high power battery pack systems have caught much attention among Electric Vehicles (EV) and Hybrid Electric Vehicles (HEV) makers as these concerns are working as the primary bottleneck in the mass deployment of these environment friendly vehicles on the roads. Several methods – air cooling, liquid cooling, and phase change method including microchannel cooling method – exist in literature for thermal management and preventing thermal runaways in such power battery systems like LiO power battery systems. Herein, we conducted thermal modeling and simulations of power battery pack systems and proposed a novel microchannel cooling design that is not only adequately effective, but can also prevent thermal runways under triggering scenarios like high charging and discharging rate (occurring during sudden acceleration). Effect of different battery parameters and operating conditions are investigated. An optimization of the microchannel cooling design in attempted to seek for optimal cooling design and optimal working range.