

A Comprehensive Review of Thermal Management Solutions for EV Battery Systems

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Abstract: *Avoiding and minimizing carbon emissions and air pollution is one of the main obstacles to the automotive industry's technological advancement. Additionally, in response to the European Union's promotion of limiting the use of conventional fuel-powered vehicles, such as diesel and gasoline vehicles, the automotive industry has increased research and field applications of electric vehicles. Furthermore, in reaction to the European Union's push to limit the use of traditional fuel-powered vehicles, such as gasoline and diesel vehicles, the automotive industry has increased research and field applications of electric vehicles. Compared to internal combustion engines, the batteries used in electric vehicles today have a significantly longer cycle life, are more environmentally friendly, have a longer driving range, and require less time to charge. Depending on the various techniques used to cool the phase change materials, the multi-physical battery thermal management systems are classified into three categories: air-cooled systems, liquid-cooled systems, and heat-pipe-cooled systems.*

Keywords: Thermal Management Systems, Battery Thermal Control, Active Cooling, Passive Cooling