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Design, Development and packing of Lithium Ion Battery Pack for Electric Vehicles

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Abstract

Electric vehicles (EVs) have gained significant traction in recent years due to their eco-friendliness and energy efficiency. The Lithium-ion battery (LIB) is the most popular type of rechargeable battery used in EVs due to its high energy density, longer lifespan, and low self-discharge rate. The design, development, and packaging of Lithium-ion Battery Packs (LBP) are crucial to the performance, safety, and cost-effectiveness of electric vehicles. The design of LBP involves selecting the appropriate battery cells, determining the number of cells required, and configuring them in series or parallel connection to achieve the desired voltage and capacity. The selection of battery cells is based on factors such as energy density, power density, cycle life, and cost. The LBP must also be designed to fit the specific requirements of the EV, including its size, weight, and power output. The development of LBP involves testing and validating the design using advanced simulation software and experimental testing. This includes testing for factors such as temperature control, thermal management, and safety features such as overcharge and over-discharge protection. The packaging of LBP involves designing the enclosure for the battery pack, including insulation, cooling, and protection from external damage. The packaging design must also meet regulatory safety standards and be optimized for weight and cost. The LBP packaging must also be easily accessible for maintenance and replacement of battery cells. Overall, the design, development, and packaging of Lithium-ion Battery Packs for Electric Vehicles require a multidisciplinary approach, combining expertise in mechanical, electrical, and chemical engineering. These efforts aim to improve the performance and safety of electric vehicles while reducing their cost and environmental impact. As