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## Design and development of smart enclosure for batteries in the application of electric vehicle

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The new technology of battery operated vehicles is likely to replace the conventional IC engine automobile technology soon. Thermal efficiency of IC engine can only 40% at the best, electric motors, drawing energy from batteries, can operated with peak efficiency of up to 90%. Also, electric vehicles can recapture wasted energy through regenerative braking. To maintain efficient function of battery, an enclosure with auto adaptive material and smart feature is needed to investigate. This research work will provide a solution for development of battery enclosure for automotive. Outdoor enclosures to provide housing for batteries and electronic circuit boards are widely used in a variety of technologies including telecommunications, industrial, railways, automotive, electric vehicle, aviation and military applications. These enclosures protect the equipment against a wide variety of environmental hazards, such as the sun, dust, moisture, etc. As electronic components have become more powerful and complex, thermal management has become a critical issue. Battery enclosures designing requirements are to understand the mechanical, electrical, electronic and safety features. We need to maintain at least Ingress protection of battery enclosure at a level of IP65. The thermal management of the enclosure with IP65 is very challenging due to the additional thermal load from the sun and the requirement of having an air-sealed enclosure. We need to consider the effect of solar heating loads in order to compute the life expectancy of the electronic product. Hence, the enclosure is designed to consider the maximum ambient temperature of 65°C. In the mechanical structure of the enclosure system, many other parameters are to be considered in designing. These include: reliability, maintenance, size and weight, environmentally friendly, ability to cool below ambient, temperature control and stability, heating options, orientation, portability, power, noise and vibration, initial cost, operating and maintenance cost.

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