

High-Power Battery for Hybrid Electric Vehicles

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Recent serious deterioration of urban air has driven regulators to require environmentally friendly transportations and therefore auto manufacturers have started to produce Hybrid Electric Vehicles (HEV). HEV combines the existing internal combustion engine of a vehicle with the electric motor powered by battery and results in twice the fuel economy of conventional vehicles. By taking the advantages of the combination, HEV offers significant reduction of smog-forming pollutants over the current level of emissions. There are some hybrids already on the market which cut emissions of global-warming pollutants by a third to a half, and future products are expected to cut emissions by even more.

The crucial characteristics such as the performance and life-cycle costs of HEV is mainly depend on the performance and life of their batteries. High-power battery operates over a particular operating range to achieve optimum life and performance. Lithium battery technology is now selected for the auxiliary power sources by, for example, Partnership for a New Generation of Vehicles (PNGV) program, a research collaboration involving the federal government and the US automotive industry which aimed to produce a production prototype of a full-size HEV that will get three times the mileage of today's models with no sacrifice in safety, performance, affordability, or compliance with emission standards by 2004. Since required properties for high-power battery and high-energy battery are different, it needs special approaches to incorporate materials chemistry and conduct well-defined thermal abuse and accelerated aging tests on the cells to identify the main factors that control their life and abuse tolerance. In this study, the current effort for the development of high-power battery would be addressed.