

Modular, high-performance system can power hybrid electric vehicles



O A A T A C C O M P L I S H M E N T S

High-Power Lithium-Ion Battery

Challenge

Hybrid electric vehicles (HEVs) hold the promise of meeting the Partnership for a New Generation of Vehicles (PNGV) goal of an 80 miles per gallon mid-size vehicle. To achieve that goal, HEVs require batteries that meet stringent performance, safety, and cost targets. Research has shown that only lithium-based batteries and nickel-metal hydride batteries can meet these targets.

Technology Description

U.S. Department of Energy researchers worked with industry to develop a lithium-ion battery that achieves high power in an integrated system small enough to fit inside a mid-size vehicle engine compartment. The design integrates temperature, battery management, and cell balancing systems. Based on the battery used in DaimlerChrysler Corporation's ESX3 concept vehicle, the current lithium-ion unit employs a modular design allowing battery packs to be located separately from the battery's management systems.



Integrated high-power lithium-ion battery pack.

Accomplishments

Researchers developed a compartmentalized, integrated design that fits easily into available vehicle space. When space is more limited, the battery packs can be located away from the battery management and high-voltage units.

Benefits

The compact, integrated, lithium-ion battery system meets stringent performance specifications in a safe and reliable manner, and provides enough power to allow HEVs to compete with conventional vehicles.

Contacts

Raymond Sutula
Team Leader/Manager,
Energy Management
202-586-8064
202-586-1600 fax
raymond.sutula@ee.doe.gov

Guy Chagnon
Manager, HEV Programs
SAFT America, Inc.
410-771-3200
410-771-0234 fax
guy.chagnon
@saftamerica.com

Future Activities

To meet or exceed PNGV specifications, researchers will continue to focus on doubling battery life to 15 years, reducing cost by a factor of about 5 to \$300, and enhancing tolerance to abuse. Life evaluation tests will also be conducted to verify, at the battery level, system performance in vehicles.

Manufacturing process improvements will be pursued and industry partners will work with electronics component suppliers to reduce materials costs.

Partners in Success

- DaimlerChrysler Corporation
- SAFT America, Inc.

