

Energy Storage For Hybrid Vehicles

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Prototype of a lithium-polymer accumulator for use in hybrid vehicles. Credit: Fraunhofer ISIT

Hybrid technology combines the advantages of combustion engines and electric motors. Scientists are developing high-performance energy storage units, a prerequisite for effective hybrid motors.

The vehicle is powered by petroleum on the freeway and by electricity in town, thus using considerably less energy. A hybrid propulsion system switches over to generator operation when the brakes go on, producing electric current that is temporarily stored in a battery.

The electric motor uses this current when starting up. This yields tremendous savings, particularly in urban traffic. But up to now, hybrid technology has always had a storage problem. Scientists from three Fraunhofer Institutes are developing new storage modules in a project

called "Electromobility Fleet Test". The pilot project was launched by Volkswagen and Germany's Federal Ministry for the Environment BMU together with seven other partners.

The Fraunhofer Institutes for Silicon Technology ISIT in Itzehoe, Integrated Circuits IIS in Nuremberg, and Integrated Systems and Device Technology IISB in Erlangen will be pooling their expertise for the next three years. The researchers are developing an energy storage module based on lithium-polymer accumulator technology that is suitable for use in vehicles.

"This module has to be able to withstand the harsh environmental conditions it will encounter in a hybrid vehicle, and above all it must guarantee high operational reliability and a long service life," states ISIT scientist Dr. Gerold Neumann, who coordinates the Fraunhofer activities. The researchers hope to reach this goal with new electrode materials that are kinder to the environment. A specially developed battery management system makes the energy storage device more durable and reliable. The experts are also researching into new concepts that will enable large amounts of energy to be stored in a small space. To do this, they integrate mechanical and electrical components in a single module, devising systems for temperature control, performance data registration and high-voltage safety.

The tasks involved are distributed between the three Fraunhofer Institutes according to their skills: The ISIT experts, who have long experience in developing and manufacturing lithium accumulators, are manufacturing the cells. Their colleagues at IIS are responsible for battery management and monitoring. The scientists from IISB are contributing their know-how on power electronics components to configure the accumulator modules. The development and configuration of the new energy storage module is expected to be finished by mid-2010. Volkswagen AG – the industrial partner in this project – will

then carry out field trials to test the modules' suitability for everyday use in the vehicles.

Source: Fraunhofer-Gesellschaft

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