



LASER BEAM WELDING OF BATTERY CELLS FOR HYBRID VEHICLES

Task

The European Union's climate targets pose major challenges for the automotive industry in Europe. To meet them, the EU project ADVICE is intended to promote the acceptance and spread of hybrid vehicles. Various types of hybrid drives are being investigated and further developed on the basis of demonstrator vehicles. As part of the project, a high-performance battery system is being developed for a VOLVO S90.

Method

Limited space and high power requirements are the main challenges. The high power or current requirement for discharging and charging by recuperation also affects the design of the laser beam process used for contacting the battery cells. So that the 186 prismatic cells can be interconnected per module with the lowest possible electrical resistance, large connection cross-sections must be achieved on a small area. At the same time, the thermally sensitive battery cell must not be subjected to excessive thermal stress during the welding process.

Results

By simulating the thermal load, Fraunhofer ILT and project partners were able to optimize the process control and reduce the maximum temperatures. With the resulting laser-beam welding process, the battery cells could be welded semi-automatically. In order to achieve the necessary current-carrying cross-section, four parallel weld seams, each with a seam width of around 600 μm , were generated in the overlap configuration. The assembled battery system was successfully integrated into the vehicle and tested by the project partners.

Applications

The developed system can be used in the field of electromobility and battery technology to advance research in this area. The results can also be transferred to applications with high demands on the electrical current carrying capacity of the connections.

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- 3 Laser-welded battery connector.
- 4 Battery module for the hybrid Volvo S90 Recharge.