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LASER BONDING IN BATTERY TECHNOLOGY

Task

When battery modules and packs are manufactured, the individual cells are always connected such that higher voltages or capacitances can be generated. Thus, the joining of the individual cells is a critical manufacturing step which requires reliable, low resistance connections, stable processes and a high degree of automation. In this case, production needs to be highly flexible.

Method

A machine built within the scope of the publicly funded project »RoBE« (Robustness for Bonds in Electric Vehicles) – the Laserbonder – should be used for the joining task described above. Since the welding process »oscillation welding« has been integrated into a conventional ribbon bonder, a new machine technology has been created, in which a new laser welding process is used instead of conventional ultrasonic bonding. The project focused on applications for the electrical contacting of electronics, particularly power electronics. When the project was concluded, first feasibility studies were conducted to investigate the wider use of the process. It was shown that, when the process was combined with the feed of a flexible connector (ribbon), an excellent opportunity was created of contacting battery cells.

Result

This method is applicable for all prismatic and cylindrical battery cells. In particular, the process is characterized by the possibility of generating the connections quickly, flexibly and effortlessly in terms of positioning, of contacting the individual cells and, therefore, of producing modules or packs. Here, too, both the use of aluminum and copper materials is possible.

Applications

The machine technology and the process can be used in wide areas of the power electronics and the battery industry. Laser bonding can be used to great advantage especially where fast and flexible contact solutions are required.

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Contacts

André Häusler M.Sc.
Telephone +49 241 8906-640
andre.haeusler@ilt.fraunhofer.de

Dr. Alexander Olowinsky
Telephone +49 241 8906-491
alexander.olowinsky@ilt.fraunhofer.de

- 3 Top of a 18650 battery cell with welded copper strips.
- 4 Example of the construction of a four-cell 18650 module with contact on both poles of the upper side.