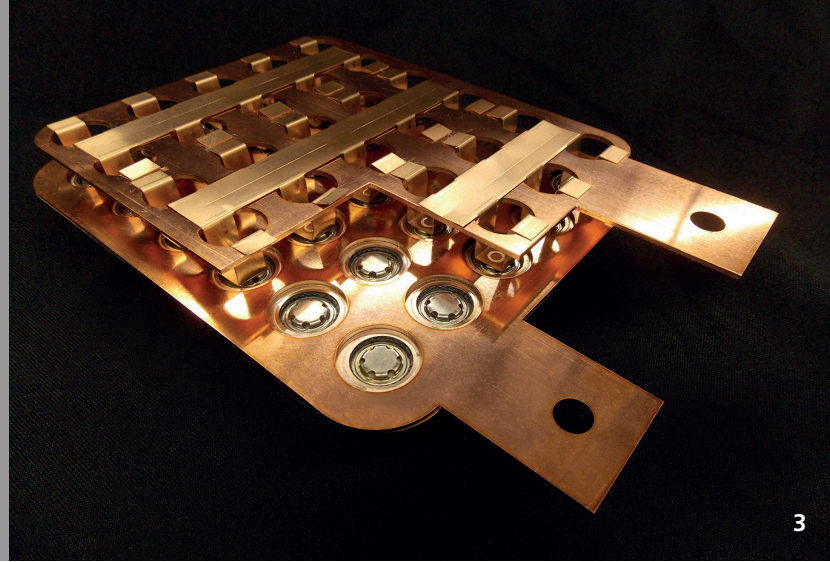




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## LASER-BEAM MICRO-WELDING FOR THE CONTACTING OF LITHIUM-ION CELLS

### Task

Since the demand for rechargeable batteries in electric vehicles and stationary energy storage systems is increasing, while individual cells still currently have low capacity, the connection technology of individual cells to powerful modules will become increasingly important in the near future. For this, joining processes capable of series production need to be developed.

### Method

Due to its precise energy input, laser micro-welding has proven to be a suitable process for this application. So that the weld quality and process stabilization can be improved, local power modulation can be applied, wherein the global feed is superimposed with a circular oscillation. The connection technology was studied in different cell types (for example, an 18650 or a pouch cell). While safety factors are taken into account, the necessary connection cross-sections can be dimensioned and achieved by means of the welding parameters.

### Result

The contacts can be produced reproducibly and reliably. Dissimilar materials can be joined by welding with local power modulation and the connection cross-section increased due to the additional lateral beam deflection. Thereby, a decrease in strength can be counteracted by the formation of intermetallic phases.

### Applications

The welding strategy described here can be used to connect batteries in electric mobility and in stationary applications. Similarly, the findings can be applied to joints of electric cables and contacts in power components. An example of application was the welding of lithium-ion cells for the »Ecurie Aix Formula Student Team« of RWTH Aachen University.

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### Contacts

Dipl.-Ing. Paul Heinen  
Telephone +49 241 8906-145  
paul.heinen@ilt.fraunhofer.de

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

- 2 *Welding on Li-ion pouch cells.*  
3 *Joined macrocell consisting of 30 18650 cells.*