

# PRESS RELEASE

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## New Process on Proven Machinery: Projection Welding of Copper on Battery Cells

**A consortium of scientists from the Fraunhofer Institute for Solar Energy Systems ISE and Smart Battery Solutions GmbH succeeded in replacing the steel connectors used to interconnect battery cells with copper during resistance projection welding. In doing so, the team demonstrated something that had long been considered impossible in the battery industry: Until now, battery manufacturers looking to switch to more powerful, copper-interconnected batteries had to replace their projection welding systems with laser welding systems.**

Batteries consist of individual battery cells that are electrically connected to one another, currently mostly by welding steel onto them. Projection welding is a cost-effective, established process, but steel connectors are limited in their electrical conductivity. Replacing steel connectors with copper ones makes batteries lighter and thus more powerful.

“German battery manufacturers face the challenge of having to work with the battery cells they receive from their suppliers,” explains Dr. Achim Kraft, Head of the Module Technology Department at Fraunhofer ISE. “These cells are becoming larger and more efficient. Consequently, the steel connections must become increasingly thicker and heavier. It has therefore long been clear to the battery industry that, in the medium term, all interconnections should be based on copper.”

A research team at Fraunhofer ISE, in collaboration with the German battery manufacturer Smart Battery Solutions GmbH, has now succeeded in developing a process for use on projection welding systems, such as those commonly used in battery production today. “The copper does not need to be tinned or otherwise pretreated for this,” says Christian Schiller, a researcher at Fraunhofer ISE and project manager of the research initiative. “And most importantly: battery manufacturers do not need to switch to laser welding systems for the interconnections in order to electrically connect the copper connections into a battery module.”

Smart Battery Solutions will now be the first battery manufacturer to introduce the new process on its production line. “The new batteries with copper connections will be a part of our UniPower product family,” says Monika Mertig at Smart Battery Solutions. “The fact that we only need to adapt our proven interconnection process for this and don’t have to completely replace it with new equipment makes the transition much

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easier for us. We see this R&D success as a major opportunity for German battery manufacturers, many of which are small and medium-sized enterprises.”

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The research is being conducted as part of the project “BatCO<sub>2</sub>tiv – Battery Interconnection: Automated, CO<sub>2</sub>-Reducing, Collaborative. Subproject: Process Development and Evaluation for Projection Welding” and is funded by the German Federal Ministry for Economic Affairs and Energy (BMWE).

Learn more about the process and meet our experts:

**Freiburg Battery Days 2026 | April 28–29 | Freiburg im Breisgau**

During the two-day conference, Christian Schiller will give a presentation on battery interconnection: *Cell Interconnection Technologies for Battery Modules: Resistance Projection Welding of Copper*

More information: <https://www.ise.fraunhofer.de/en/events-and-trade-fairs/freiburg-battery-days.html>

**Further information:**

Research project “BatCO<sub>2</sub>tiv – Battery Interconnection: Automated, CO<sub>2</sub>-Reducing, Collaborative. Subproject: Process Development and Process Evaluation for Projection Welding”:

<https://www.ise.fraunhofer.de/en/research-projects/batco2tiv.html>

Fraunhofer ISE R&D services on interconnection technologies for battery cells:

<https://www.ise.fraunhofer.de/en/business-areas/electrical-energy-storage/production-technology-for-batteries/interconnection-technology-for-battery-cells-and-modules.html>

Smart Battery Solutions GmbH website:

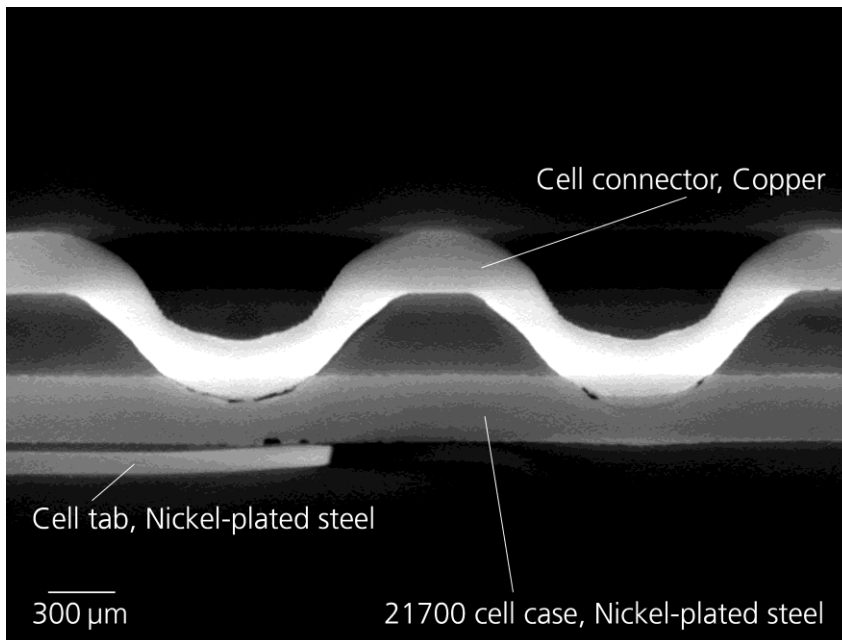
<https://smart-battery-solutions.de/en/>

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Project Manager Christian Schiller at a projection welding machine where battery cells are connected using copper connectors. © Fraunhofer ISE / Photo: Felix Thurn



Nano-computed tomography of the bottom of a 21700 battery cell with welded-on copper connectors. The uncoated copper connector is welded directly onto the battery cell using projection welding without damaging it. © INATECH SSE

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