Within the framework of the joint project »BatCon« (Num. 01 MX12055C), funded by the Federal Ministry for Economic Affairs and Energy, Fraunhofer IWS scientists have developed novel property- and cost-optimized joining techniques for the fabrication of aluminum-copper cell joints over the past three years. In December 2015 all cooperation partners – Robert Bosch GmbH, ElringKlinger AG, Wieland-Werke AG and the Fraunhofer IWS – met for the final colloquium in Dresden. All partners and the project management – the Deutsche Zentrum für Luft- und Raumfahrt (DLR) – were highly pleased with the results. The IWS scientists were able to decisively further develop the technologies for joining processes for cyclically loaded and non-aging Al/Cu-cell joints with very low transition resistance. An implementation into industrial application with industrial partners is very close.

Innovative joining technologies such as laser welding, friction-stir welding, ultrasonic welding and laser induction roll plating have been studied with regard to their suitability for the fabrication of functionally integrated high current joints. These can be used for battery modules. Of all procedures mentioned, the laser induction roll plating technique proved to be the most promising approach to meet customers’ requirements. This IWS patented technology best fulfills demands with regard to reproducible process qualities and high component reliability and, last but not least, is significantly more cost-saving than other welding technologies.

In particular the IWS high-resolution electron microscopy enabled our scientists to study intermetallic phases in the joint and to detect the influences of joining techniques and process parameters. The intermetallic, brittle phases affect the operational safety and the electric properties of these joints. For this reason they are of the utmost importance for electromobility.

“Only our fundamental studies in the characterization of joining zones enable us to achieve a profoundly increased understanding of the process, which is in particular necessary for the joining process of aluminum and copper”, explained Dr. Jörg Kaspar, IWS project manager. “The process principle of the laser induction roll plating is so flexible that it will even enable, after the refitting of the system, the fabrication of joints for future Al/steel composite constructions. Already now there is vivid interest in further developments of process technologies and plant concepts with respect to steel/Al- and Ti/Al-semi-finished products, which are applied in lightweight constructions in the automotive and aerospace sector. We will intensify our research in this direction after the successful completion of the BatCon project.”
Dr. Jörg Kaspar (right) presents the battery demonstrator and explains the developed joining technologies.
© Frank Höhler / Fraunhofer IWS Dresden

The results of the BatCon project will be presented at the international joining symposium “Tailored Joining” being held on February 23 – 24, 2016 within the framework of the international laser symposium “Fiber, Disc & Diode”. Already the day before, Monday, 22nd February, 2016 we will offer basic courses for selected technologies, which include practical demonstrations in our and our partner’s labs. These courses offer the possibility to become quickly familiar with technologies to evaluate their possibilities and limits even to newcomers. At 5 p.m. the IWS will open its doors for interested companies and for participants of the workshop and symposia. We will provide live demonstrations and presentations, dealing with different topics related to laser and joining technologies. In addition to the chance to visit many demonstrations there will also be some culinary snacks and excellent opportunities for discussions with our scientists and project managers.

For further information please visit www.fuegesymposium.de

Supported by:

Federal Ministry for Economic Affairs and Energy

on the basis of a decision by the German Bundestag

Förderhinweis: Zuwendung aus dem Sondervermögen »Energie- und Klimafonds« für das Verbundprojekt »Funktionsintegrierte Hochstrom-Verbinder für Batteriemodule mittels kostenoptimierter Fertigungstechnologien (BatCon) « für das Teilvorhaben: »Fügeverfahren und werkstofftechnische Grundlagen für Al-Cu Zellverbinder« Förderkennzeichen: 01 MX12055C
Contact:
Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS Dresden
01277 Dresden, Winterbergstr. 28

Dr. Jörg Kaspar
Phone: +49 351 83391-3216
Fax: +49 351 83391-3300
E-Mail: joerg.kaspar@iws.fraunhofer.de

Public Relations
Dr. Ralf Jäckel
Phone: +49 351 83391-3444
Fax: +49 351 83391-3300
E-Mail: ralf.jaeckel@iws.fraunhofer.de

Internet:
http://www.iws.fraunhofer.de und