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## Press Release

### Research into new Industry 4.0 solutions for the production of lithium-ion batteries - Coperion as a research partner of the Technical University of Braunschweig

## Smart Production Solutions for the Extrusion of Battery Compounds

*Stuttgart, June 2021* - As a project partner, Coperion GmbH, Stuttgart, supports the Technical University of Braunschweig in the research of smart production solutions in the extrusion of battery compounds. The overriding aim of the "DaLion 4.0" project (data mining in the production of lithium-ion battery cells) is to develop new Industry 4.0 approaches for the production of lithium-ion batteries and to use the findings for more efficient and more effective manufacturing. To this end, concepts for cyber-physical production systems are being developed and integrated into the production of battery cells.

### Continuous production with Coperion twin screw extruders

The research project is divided into various areas of activity and is supported by several industrial partners. One key aspect of this research is the investigation and conversion of the mixing process of the electrode slurry from a batch process to continuous extrusion. The continuous extrusion process using a twin screw extruder is particularly suitable here and offers numerous advantages for ensuring high and reproducible end product quality. This process also enables greater material efficiency as well as optimized, cost-efficient battery compound production. Continuous extrusion also offers high reliability, long operating times and safe production even when using hazardous ingredients. For processing the electrode slurry, the Technical University of Braunschweig uses a Coperion ZSK 18 MEGAlab twin screw extruder.

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The ZSK twin screw extruder is ideal for this task, as it is equipped with optimal mixing properties and offers very high flexibility and safety. Safe scale-up to other machine sizes and thus manufacturing scales is possible.

### **Integrated Industry 4.0 approaches for optimizing the production of battery compounds**

In addition to the conversion of the manufacturing process to continuous extrusion, the focus is on integrating sensors into the extruder, which will supply the required data for the development of Industry 4.0 features. In the course of the project, a close cooperation developed between Battery LabFactory, represented by the Institute for Particle Technology at the Technical University of Braunschweig, and Coperion. The Institute for Particle Technology is researching new and established in-line-compatible methods, such as spectrometry, particle size and torque measurements to continuously monitor the quality of the electrode slurries produced. In close cooperation, the Technical University of Braunschweig and Coperion have developed requirements and possibilities for integrating new sensors. Coperion then successfully integrated a high-precision torque sensor into the system, which can not only output the data locally at the measurement station, but also automatically transfer it to a higher-level production system. This is realized via an interface developed by Coperion that enables process models to be created for optimizing battery compound production.

"We are delighted to be able to support such a research project at the Technical University of Braunschweig with our twin screw extruders. Continuous production and new Industry 4.0 applications will help to optimize the complex production of battery compounds and simplify the manufacture of these products in the future", said Markus Schumde, Head of Research & Development at Coperion in Stuttgart.

The DaLion 4.0 project (data mining in the production of lithium-ion battery cells) is funded by the Federal Ministry for Economic Affairs and Energy under the funding code 03ETE017C.

#### **About Coperion**

Coperion is the international market and technology leader in compounding and extrusion systems, feeding and weighing technology, bulk materials handling systems and services. Coperion designs, develops, manufactures and maintains systems, machines and components for the plastics, chemicals, pharmaceutical, food and minerals industries. Within its two divisions – Polymer and Strategic Markets / Aftermarket Sales and Service – Coperion has 2,500 employees and nearly 30 sales and service companies worldwide. For more information visit [www.coperion.com](http://www.coperion.com) or email [info@coperion.com](mailto:info@coperion.com).

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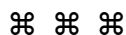
### About Battery LabFactory Braunschweig (BLB)

The Battery LabFactory Braunschweig (BLB) is a research center of the TU Braunschweig. We investigate and develop electrochemical storage devices from laboratory to pilot plant scale. Our research spectrum covers the entire value chain from material development, electrode and cell manufacturing up to recycling. The BLB holds the technical equipment to analyze large-size traction batteries as well as battery modules and packs. Our infrastructure allows us to answer fundamental and application-oriented research questions. A focus is put on flexible production strategies and process technologies to increase energy density, quality and safety of traction batteries considering electrical, electrochemical, ecological, constructive and economic aspects. For this purpose, the engineering and science expertise of 9 institutes of the TU Braunschweig as well as Technische Universität Clausthal, Leibniz Universität Hannover, Fraunhofer Institute for Surface Engineering and Thin Films IST and Physikalisch-Technische Bundesanstalt (PTB) is bundled in this joint LabFactory.

<https://www.tu-braunschweig.de/en/blb>

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*The Coperion ZSK 18 MEGA lab twin screw extruder is used at the Technical University of Braunschweig in order to research a modernization and new Industry 4.0 approaches in the manufacture of battery materials.*

*Photo: Coperion, Stuttgart*