Fraunhofer BATTERY

Fraunhofer Battery Alliance

Cell production

Stacking unit for small-series production (© Fraunhofer IWS)

The 26 member institutes of the Fraunhofer Battery Alliance develop technical and conceptual solutions along the entire value chain of electrochemical energy storage systems up to the application level on behalf of customers or in publicly funded projects together with industry. Our expertise and many years of experience range from materials development to system integration of mobile and stationary storage systems.

Competences and field of work

The improvement of existing cell systems and research on future technologies are a key area of work within the Fraunhofer Battery Alliance. The member institutes not only develop innovative electrode materials but also provide the opportunity to further increase these materials properties for use in industrial products, through a close and targeted collaboration with partner institutes.

One focus is on improved manufacturing processes to increase cell performance while reducing costs and pollutant emissions in production. Within the process chain for manufacturing lithium-ion batteries, the slurry mixing and coating steps are particularly critical, as even small deviations in the parameters have significant effects on the quality of the battery cells. For this reason, special attention is being paid to sustainable, resource-saving and cost-effective electrode manufacturing in the cell production, and new processes are being developed, investigated and evaluated. Laser processes are of great importance for cutting electrodes and welding electrode stacks. The processes systematically developed in R&D are therefore scaled up and optimized with several mixers, coating systems and subsequent assembly units.

Furthermore, new production processes for future technologies such as solid-state batteries are also being considered. Processes to produce dry components are being tackled with

additive manufacturing or new coating processes. In addition, the holistic development and production of lithium-sulfur cells is subject of current work. In particular, the handling and deposition of metallic lithium in the context of process technology is of interest.

The member institutes also deal with the entire digitalized factory planning as well as the design of IT architectures, data acquisition and processing, the development of traceability solutions in battery cell production and specific quality management. The design and development of digital twins completes the activities of the Fraunhofer Battery Alliance.

Pilot plants and applications

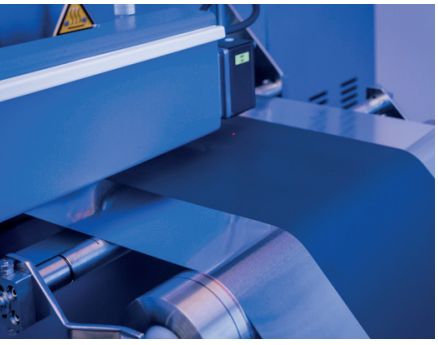
Our institutes operate special pilot plants for transferring results obtained in the laboratory to industrial scale. The available production capacities ensure the rapid implementation of research findings into small-scale production, while industrial customers also profit from this process know-how.

In addition, battery cells can be tailored to suit the requirements of specific applications, whereby various cell formats are considered. The foil housing allows the cell geometry to be adapted to specified dimensions over a wide range, a focus on pouch cells enables a flexible component design. Cells and cell modules constructed in this way can be fitted precisely into the available space.

Our offer

- Development of electrode foils and tailored formulations
- Process development for innovative, cost-efficient electrode and cell production processes
- Development of new coating technologies and energy-efficient drying processes
- Prototype production of customer-specific battery cells
- Development of laser processes for separating electrodes or welding and joining cells into modules
- Evaluation of new materials and components in electrochemical cells
- Holistic development of lithium-sulfur batteries and solid-state batteries
- Post-mortem analysis to determine the impact of manufacturing parameters
- Modeling of cell behavior and failure
- Studies, roadmaps and techno-economic evaluation

Please feel free to contact us – with many years of experience and expertise, we will collaborate with you to develop customized solutions tailored to your needs.



Continuous electrode manufacturing (© Fraunhofer IFAM).

Equipment for large-scale mixing (© Studio Wiegel / Fraunhofer FFB).

Contact

Prof. Dr. Jens Tübke
Spokesperson

Dr. Kai-Christian Möller
Deputy Spokesperson

Dr. Katharina Ahlbrecht
Head of Coordination Office

c/o Fraunhofer ICT
Joseph-von-Fraunhofer-Straße 7
76327 Pfinztal
Germany

allianz.batterien@zv.fraunhofer.de
www.batterien.fraunhofer.de