

PRESS RELEASE

Fraunhofer ITWM at the »Battery Show Europe 2024« in Stuttgart

Holistic Battery Simulation: Production, Quality Control, Driving Behavior

Battery simulation has been a focus of research at the Fraunhofer Institute for Industrial Mathematics ITWM in Kaiserslautern for many years. Quality control has recently been added to this area of research. The focus here is on electrodes and their conductive properties. At the leading trade fair "Battery Show Europe" in Stuttgart, the institute will be presenting its innovations in Hall 9 at Stand B85.

The focus will be on the latest version of the battery and electrochemistry simulation tool BEST and the optimization of the production of lithium-ion cells and battery packs. In the INTENSE project, researchers have developed a completely new measurement technology for the quality control of battery electrodes, which will also be presented in Stuttgart.

Coating Thickness Measurement: Good Resolution Despite High Penetration Depth

Until now, either sensors with good signal penetration depth but low resolution or broadband terahertz sensors, which have very high resolution but only on thin layers with low absorption, have been used for quality control of battery electrodes.

The researchers at the Fraunhofer ITWM have now been able to combine the strengths of both processes in a new sensor technology. Together with the Fraunhofer Institute for Telecommunications HHI, they developed a »contact-free, high-resolution inline coating thickness measurement technology for highly absorbent materials« in the INTENSE project. The result is a demonstrator that will be used in the automotive industry following the successful project.

Digital Experiments in the Computer: Physical Simulation of LI-Ion Batteries

In the field of electromobility, the requirements for lithium-ion batteries are very high. Computer simulations help to assess the performance of potential new battery cells and to understand the microscopic relationships.

FRAUNHOFER INSTITUTE FOR INDUSTRIAL MATHEMATICS ITWM

The Fraunhofer ITWM uses the »Battery and Electrochemistry Simulation Tool« [BEST](#), a software environment for the physics-based, three-dimensional simulation of lithium-ion batteries. It is continuously being expanded and adapted to the individual needs of companies.

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Optimized Production of Lithium Batteries

Large battery factories are being built in many places in Europe to meet the demand for cells. Is it possible to make production efficient without compromising the quality of the batteries? The Fraunhofer ITWM has a practical answer to this question too: a cross-departmental team is currently researching an m model that simulates individual process steps in battery production, enables non-destructive quality control and includes energy management with predictive control. This not only provides industry partners with valuable information about the manufacturing process of batteries, but also about their ageing under different stresses.

Further Innovations at the Joint Fraunhofer Booth

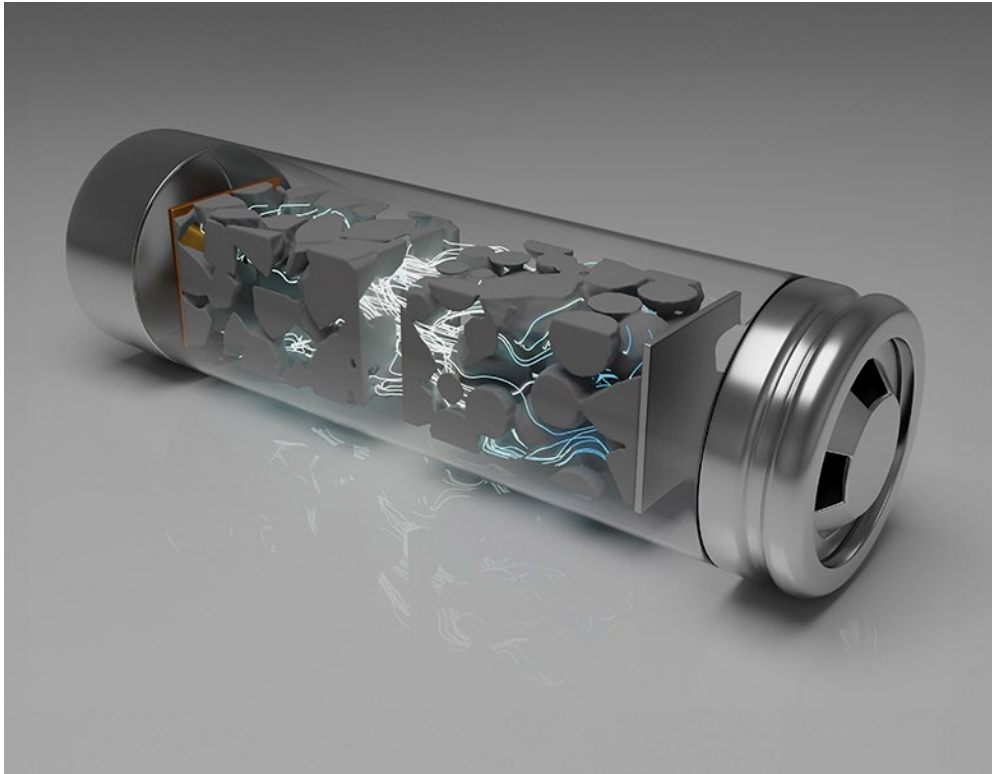
The joint stand of the [Fraunhofer Battery Alliance](#) also presents Fraunhofer research on all aspects of batteries. You will find it in hall 9, stand number J36.

Further information can be found on our [event page](#) our pages of the field of activity »[Electrochemistry and batteries](#)«

Image Material



Production line for battery cells at the Fraunhofer Research Fab Battery Cell FFB, a project partner of the Fraunhofer ITWM © Fraunhofer FFB / Studio Wiegel



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Simulation of the Physical Processes in a Battery Cell © Fraunhofer ITWM

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About the Fraunhofer Institute for Industrial Mathematics ITWM

The Fraunhofer Institute for Industrial Mathematics ITWM in Kaiserslautern is one of the largest research institutes for applied mathematics in the world. We see it as our task to further develop mathematics as a key technology and to provide innovative impulses. Our focus is on the implementation of mathematical methods and technology in application projects and their further development in research projects. The close cooperation with partners from industry guarantees the high practical relevance of our work.

Their integral building blocks are consulting, implementation and support in the application of high-performance computing technology and the provision of customized software solutions. Our various areas of expertise address a wide range of customers: the automotive industry, mechanical engineering, the textile industry, energy and the financial sector. This also benefits from our excellent networking, for example in the Simulation and Software-based Innovation Center.

About the Fraunhofer-Gesellschaft

The Fraunhofer-Gesellschaft, based in Germany, is the world's leading organization for application-oriented research. With its focus on future-oriented key technologies and the utilization of results in business and industry, it plays a central role in the innovation process. As a guide and driving force for innovative developments and scientific excellence, it helps to shape our society and our future. Founded in 1949, the organization currently operates 76 institutes and research facilities in Germany. More than 30,000 employees, most of whom are trained in the natural sciences or engineering, work on the annual research volume of 2.9 billion euros. Contract research accounts for 2.5 billion euros of this total.