



Interdisciplinary Consortium

- **Institute for Particle Technology (iPAT)**
Electrode process engineering (LiB, ASSB, LiS); dry and wet extrusion coating, calendering, electrode and cell characterization; cell and process design; safety tests, recycling
- **Institute of Joining and Welding (ifs)**
Laser cutting and structuring, contacting, cell sealing and binder development
- **Institute of Machine Tools and Production Technology (IWF)**
Automatic cell assembly, electrolyte filling, cell housing, cyber-physical production systems, production simulation, LCA/LCC
- **elenia Institute for High Voltage Technology and Power Systems**
Formation and aging, cell characterization based on electrical and electrochemical measuring methods, classification
- **Institute for Engineering Design (IK)**
Design methods, production planning and development
- **Institute of Energy and Process Systems Engineering (InES)**
Simulation and model-assisted cell design, electrochemical analysis and diagnostics
- **Institute of Environmental and Sustainable Chemistry (IÖNC)**
Electrochemical, chemical diagnostic; adv. impedance methods (NLEIS, DRT) and sustainable battery components
- **Institute of Automotive Management and Industrial Production (AIP)**
Operations management, economic and sustainability assessment
- **Physikalisch-Technische Bundesanstalt Braunschweig (PTB)**
Metrology, standardization, traceability and measurement uncertainty
- **Institute of Chemical and Electrochemical Process Engineering (ICVT), Technische Universität Clausthal**
Alkaline water electrolysis, bio-electrical fuel cells, gas-diffusion electrodes, redox-flow batteries
- **Institute for Electric Power Systems (IfES) - Chair for Electric Energy Storage Systems, Leibniz Universität Hannover**
Technology selection and dimensioning methodologies, techno-economic evaluation of business models

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Battery LabFactory Braunschweig

Knowledge-driven battery production



Source: Ulrich Pucknat/Pucknat Pictures



Source: Marisol Glasserman/TU Braunschweig

Core Competences

- Excellence in process engineering along entire value chain
- Development of advanced production processes for electrode and cell manufacturing (LiB - C/Si, LiS, ASSB)
- Customized and application-specific electrode and cell development
- In-deep diagnostics for processes, intermediates and cells; metrology, especially impedance measurements
- Model-assisted processing and cell design
- Physical and electrochemical modelling as well as simulation from molecular to factory scale (CFD, FEM, DEM, Newman)
- Sustainable and energy-efficient battery production and supply chains
- Cyber-Physical Battery Production 4.0
- Recycling and recuperation of electrode production rejects (with > 90% material recovery)

Unique Characteristics

- R&D platform for production, diagnostic and simulation for today's and future battery technologies
- Unique cooperation of transdisciplinary consortium in a Joint Lab (13 institutes; 1,000 m² with 200 m² dry room)
- Joint Lab covers electrode and cell production processes up to pilot scale (TRL 1-5, < 40 Ah)
- Freedom of design - large variety of production equipment
- Glovebox environment for R&D on scalable processes and production for ASSB electrodes and batteries
- Quality inspection of products and processes
- Automated production data acquisition through SCADA/MES for faster data-driven engineering
- Safety test environment with in-line FTIR gas analysis

Aims

- Establishment of knowledge-driven battery production via process-/material-property functions to enhance transfer of new materials to industrial applications
- Evaluation of impacts of production processes on battery quality and performance, costs and energy demand
- Realization of reproducible and stable production
- Development of advanced processes, process equipment and measurement techniques
- Increase of energy density, power density and safety
- Simulation of whole battery production chain (processes, process chain, factory scale and cell properties)
- Establishment of Circular Battery Economy

Circular Battery Production

