Circular production research agenda

- Research & development for the circular battery economy
- Implementation of a knowledge-based and sustainable battery cell production and recycling
- Optimization of production processes based on quality and sustainability
- Life-cycle engineering, considering environmental and cost impacts, along the entire battery life cycle
- Cell design for efficient recycling

Technological highlights

- Development of innovative and sustainable production processes for electrode and cell manufacturing (LIB - C/Si, LiS, SSB)
- Freedom of design - large variety of production equipment (coin, pouch, cylindrical)
- Recycling pilot line (> 100 kg per hr) recuperation of electrode production rejects (with > 90% material recovery)
- Quality inspection, diagnostics and testing of products and processes

Digital production portfolio

- Physical and electrochemical modeling as well as multi-scale simulation from molecular to factory scale (CFD, FEM, DEM, P2D/Newman)
- Industry 4.0 implementation through cyber-physical production systems for many process steps and technical building services
- Automated production data acquisition through SCADA/ MES for faster data-driven engineering
- Intelligent battery production management with automated inline sensors and digital monitoring

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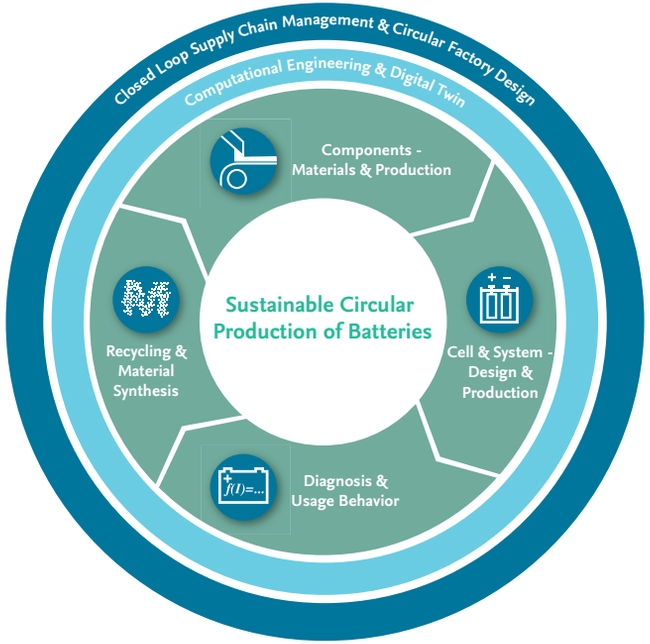
Technische Universität Braunschweig

BLB+ Braunschweig Labfactories for Batteries and more

Sustainable circular production of battery cells

Our research groups

We strive for a circular economy and a sustainable, digitized production and recycling of lithium-ion and next-generation batteries.



Key Facts

- Battery production research since 2008
- Joint LabFactory with 14 institutes and 19 Members from TU Braunschweig, TU Clausthal, Leibniz Universität Hannover, Fraunhofer IST and PTB
- More than 200 persons, i.e. professors, research associates, technicians and students working on energy storage systems
- Member of relevant associations and initiatives on a national (KLiB, VDMA Battery Production, ...) and international level (LiPLANET, Batteries Europe, BEPA, SPIRE, CIRP, ...)
- > 750 scientific peer-reviewed publications since 2015
- > 100 battery experts (M.Sc. / B.Sc.) graduate every year
- > 250 visitors each year to the International Battery Production Conference since 2018 | www.battery-production-conference.de

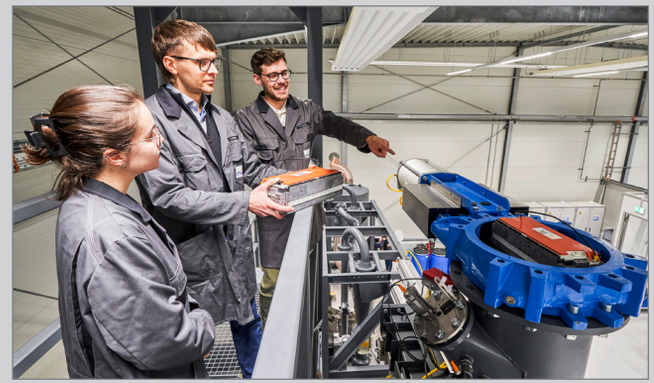
Pilot and lab facilites

ProductionLab

1500 m² cell production pilot line I **100 m²** mixing lab I **180 m²** coating and calendering line I **200 m²** dry room I **> 500** formation and cycling channels

DiagnosisLab

150 m² lab area for post-mortem investigations of aged battery cells and components in an inert atmosphere I Reassembly of aged and fresh materials to gain insights into degradation processes



CircularLab

1300 m² circular production I **400 m²** for recycling in laboratory and pilot scale I Continuous coating equipment for two-sided coating I Mechanical recycling line

EducationLab

250 m² learning factory shop floor | Combination of physical small-scale production processes and virtual process representations | Coupling with digital learning platform | Education-focused production of cylindrical LFP cells