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BATTERY LABFACTORY BRAUNSCHWEIG

Technische Universität Braunschweig

Battery LabFactory Braunschweig

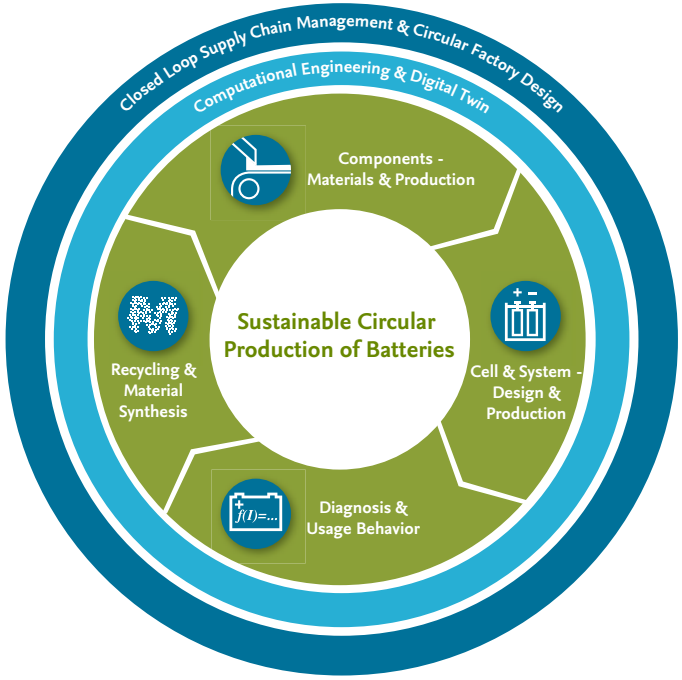
Sustainable Circular Production of Batteries

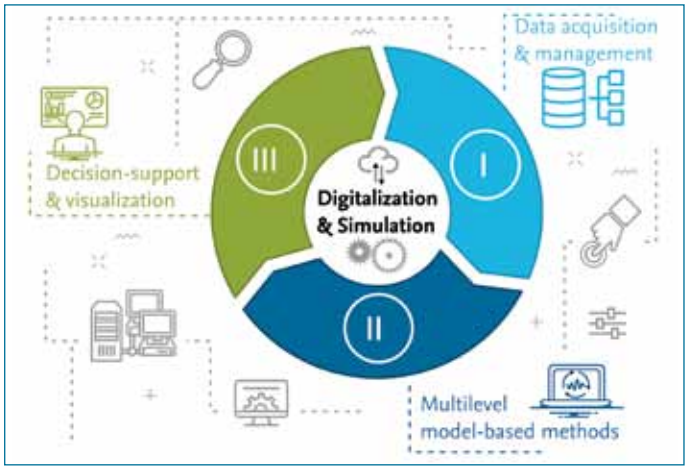
The research spectrum of the BLB covers the entire circular production and material cycle, from material synthesis to electrode and cell production to recycling.

Key Facts

- Battery production research since 2008
- Joint LabFactory with 14 institutes and 18 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 at the BLB (increasing)
- 1,500 m² pilot production
  300 m² battery recycling,
  100 m² battery safety
  750 m² laboratories for diagnostics
  (including > 800 channels)
- Member of relevant BMBF competence clusters, associations and initiatives on a national (ProZell, FestBatt, KLiB, greenBatt-Nutzung, ...) and international level (LiPLANET, Batteries Europe, BEPA, eLi, SPIRE, CIRP, ...)
- Contributing to innovation in more than 120 publicly funded projects in the last 5 years

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





Main elements of the strategy for digitalization and simulation developed in the BLB

Circular production research agenda

- Establishment of circular battery economy
- Knowledge-based, sustainable and green battery cell production and recycling
- Life-cycle engineering, considering environmental and cost impacts, along the entire battery life cycle
- Inline quality tracking for optimized production, recycling and material recovery
- Cell design for efficient recycling

Technological highlights

- Development of advanced and esspecially 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 and recuperation of electrode production rejects (with > 90% material recovery)
- Quality inspection of products and processes
- Diagnostic glovebox line for battery aging mechanisms

Digital production portfolio

- Physical and electrochemical modeling as well as 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