PRESS RELEASE

NextGenBat: Basic research for mobile energy storage systems

In the new infrastructure project NextGenBat, six institutes are paving the way for the research and development of future battery systems. RWTH Aachen University, Forschungszentrum Jülich and the Fraunhofer Institute for Laser Technology ILT are involved in the project, which will particularly strengthen the federal state North Rhine-Westphalia as a high-tech location for energy storage development. NextGenBat was launched on September 5, 2018 within the "Research Infrastructures" funding initiative of North Rhine-Westphalia as part of the operational NRW-EFRE program.

It is already expected that the solid fuel battery will have a significant impact on electromobility over the next ten years. To successfully industrialize such technologies, production engineering is a key requirement. "The NextGenBat project will make it possible for us to invest now in the technologies of the future and to explore the path towards industrially manufacturing next-generation battery cells," explains Dr.-Ing. Heiner Heimes, senior engineer at the Institute for Production Engineering of E-Mobility Components PEM at RWTH Aachen University. "As production engineers, we can help transform material innovations into competitive products."

Six institutes, two years, a budget of ten million euros

In the NextGenBat project, the six participating institutes from Aachen, Jülich and Münster are jointly developing pre-competitive research infrastructure within two years and with a budget of around €10 million. In it individual process steps will be created as module components on a pilot plant scale. With these decentralized solutions, the project participants shall pave the way for the entire value chain of the next battery generation, including all interfaces from the material synthesis of the active materials to the recycling of the cells.

The institutes are specialized in various fields of battery research, and their local proximity already unites them: a clear advantage in the targeted solution of complex tasks. One question they are tacking is, for example, how battery recycling can be optimized when novel materials are used.

Editorial Notes
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Research for the energy location NRW

In this project, the institutes intend to supplement and expand the existing infrastructure in such a way that companies in NRW will find it optimal for developing next-generation battery materials and systems. The partners and the companies will cooperate within the framework of further publicly funded projects.

The institutes are developing various NextGenBat modules for this purpose. Energy storage technologies of the next generation – especially solid-state batteries – will be developed at the Forschungszentrum Jülich: Its three institutes IEK-1, IEK-9 and IEK-12 are to develop cost-effective, scalable synthesis and manufacturing processes and advanced analytical methods, among other things. High-energy battery cells using oxidic and phosphate-based ionic conductors will be produced on a demonstrator scale. In addition, the scientists are investigating how well sulfide-based solid-state battery systems can be manufactured and processed on a laboratory scale.

PEM of RWTH Aachen University is concentrating on production technology, investigating the scalability of individual production steps for series production. Thanks to the modular concept, NextGenBat modules are also suitable for companies that do not want to develop a complete, flexible production line, but only individual aspects such as electrode production.

The core objective of the investment project at the Institute for Metallurgical Process Technology and Metal Recycling IME at RWTH Aachen University is to create a modern analysis center, independent of a particular battery system, for metallic and non-metallic fractions obtained from battery recycling. With it, for example, a chemical composition could be determined down to the ppm range. The system will use a mass spectrometer with a coupled system for high-pressure microwave pressure fusion and a wavelength-dispersive XRF instrument for measurement in melting fusion.

Laser impulses for battery development

Dr. Alexander Olowinsky, head of the Micro Joining group at Fraunhofer ILT, is working on laser-based production processes for the next generation of batteries. “NextGenBat offers us the opportunity to explore the potential of laser technology as a key technology for future cell and module concepts at an early stage and to test it in innovative systems engineering. We are thus providing important impulses for battery development,“ explains the scientist.

The first devices and systems are already being procured and will later be available at the various institutes – partly in newly created laboratories – for further developments in battery technology in research projects.

Fraunhofer ILT at LASER World of PHOTONICS

Visitors can find out more about the NextGenBat project from June 24 to 27 at the world's leading trade fair for components, systems and applications in photonics in Munich: Fraunhofer joint booth 431 in hall A2. The booth's eyecather – "eace05", an electric racing car of the Ecurie Aix Formula Student Team of the RWTH Aachen – is a good example for the use of high-performance laser processes in battery technology.

NextGenBat: Research infrastructure for future battery generations

Period: Sept. 5, 2018 - Sept. 30, 2020

Research budget: approx. €10 million

Project management: Institute for Production Engineering of E-Mobility Components PEM, RWTH Aachen

Participating partners:

- RWTH Aachen University: Institute for Production Engineering of E-Mobility Components PEM, Institute for Metallurgical Process Technology and Metal Recycling IME
- Forschungszentrum Jülich GmbH: Institute for Energy and Climate Research (IEK), Institute for Material Synthesis and Manufacturing Processes (IEK-1), Institute for Basic Electrochemistry (IEK-9), Helmholtz Institutes Münster: Ionics in Energy Storage (IEK-12)
- Fraunhofer Institute for Laser Technology ILT

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Image 1:
In battery technology, lasers already enable precise and stable connections today: Laser bonding can be used, for example, to weld copper ribbons onto battery cells.
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Image 2:
Laser beam welding of battery cells with a blue laser.
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