

## **AZL industry consortium continues series of projects to develop the next generation of battery casings for electromobility**

From the previous cooperation with a total of 79 project partners, the AZL network has defined two follow-up projects that deal with casing design for future cell technologies and methods for simulating thermal and mechanical loads in thermal runaway event. Companies with an interest in battery casings can join the two consortia including Audi AG, Magna Steyer Fahrzeugtechnik GmbH & Co. KG, Posco and Syensqo, among others, until the kick-offs on September 11<sup>th</sup>, 2024.

AACHEN, July 2024 - Electromobility is highly relevant, both in cars and in buses, trucks and increasingly also in aviation. Regardless of the material class of battery casings, the so-called thermal runaway of the cells and the associated thermal and mechanical loads is the most challenging load case and has an enormous influence on material selection, design, protective measures and ultimately on weight, costs, CO<sub>2</sub> footprint and circularity. AZL Aachen GmbH is thus pleased to announce the launch of two joint partner projects to address this challenge. The projects, 'Emerging Battery Storage Technologies' and 'Thermal Propagation in BEV Battery Casings', aim to improve the design and selection of construction methods as well as the development process of battery casings.

### **Emerging Battery Storage Technologies**

The first project focusses on the design and requirements of battery casings and how these aspects will change in the course of future battery technologies. There are continuous innovations in the field of cell chemistry. The cell configuration and in particular the cell chemistry has a major influence on the design of battery casings, both in terms of size and temperature control during normal operation as well as the level of protection required in disruptive events such as accidents and thermal runaway.

"The new project is a logical development of our previous initiatives and aims to provide valuable insights into the future of battery case design. By analysing the properties of new battery chemistries in terms of their influence on housing design and extending the scope to different vehicle types, the project will provide comprehensive insights for stakeholders along the entire value chain regarding the future competitiveness of different material, design and production concepts," says Warden Schijve, Design Leader and expert in battery casing development at AZL Aachen GmbH.

The project will include a market and technology analysis of different cell technologies, requirement for different vehicle types beyond cars, as well as the development of design concepts and cost-benefit analyses of casing concepts. Participants will gain valuable insights into the competitiveness of casing designs based on steel, aluminium, plastics and multi-material designs.

### **Thermal Propagation in BEV Battery Casings**

The second of the two projects deals specifically with the question of how the loads that actually occur in the event of thermal runaway can be predicted more accurately and how cell and casing behaviour can be further improved.

“The high thermal and pressure loads in the event of thermal runaway place very high demands on the selection of materials for the structure of battery housings. Our aim is to predict in the early development phases how battery casings will behave in the event of thermal runaway depending on the cell types and pack design and whether the safety requirements are met. This should save time and costs by reducing test campaigns and enable a better evaluation of material concepts,” explains Philipp Fröhlig, Head of Industrial Services at AZL Aachen GmbH.

The project is divided into three phases. The basis is a comprehensive analysis of the time sequence, the loads, the influence of cell characteristics and suitable models relating to thermal runaway. Subsequently, methods of analysis are developed and evaluated that enable the prediction of loads for integration into CAE analyses for component development. Finally, guidelines for the application of the method are provided.

### Participation now possible

The new ‘Joint Partner Projects’ will start on September 11<sup>th</sup>, 2024 and interested companies have the opportunity to join the consortia until then. Participants can address their specific interests and thus help steer the nine-month projects to a certain extent. The regular project meetings also offer company representatives an excellent platform to network with allied companies, make new business contacts and obtain interesting information from the market through direct dialogue.

One of the already confirmed partners is Audi AG. Dr Florian Meyer, Head of Development in CAE simulation for bodyshells, comments: “We have participated in four of AZL’s Joint Partner Project related to designing of plastic battery casings and developing application-oriented testing methods. We made valuable contacts for our supply chain and enriched our understanding on potentials of various material options. From the new starting projects, we expect valuable contributions to our advanced CAE-methods and also insights into effects of emerging battery storage technologies on the design of battery casings.”

### Contact

Philipp Fröhlig

Head of Industrial Services

Email: [philipp.froehlig@azl-aachen-gmbh.de](mailto:philipp.froehlig@azl-aachen-gmbh.de)

Telephone: +49 241 475 735 14

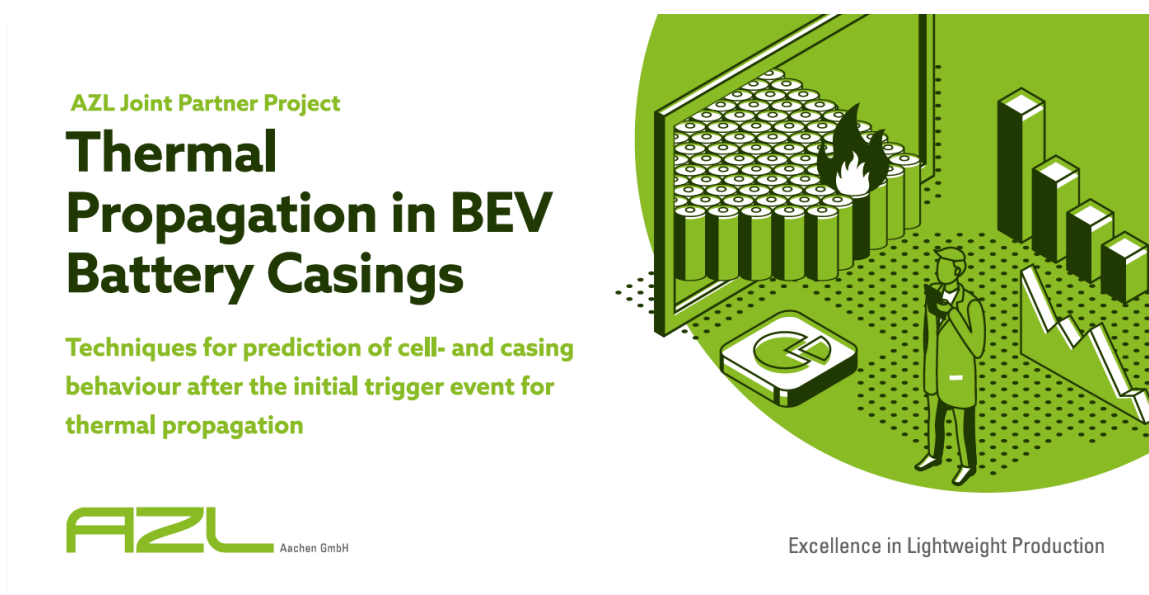


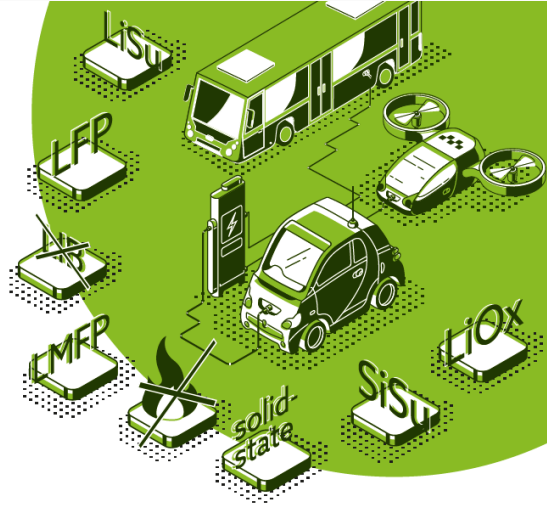
Image 1: Key-Visual “Thermal Propagation in BEV Battery Casings” © AZL Aachen GmbH

AZL Joint Partner Project

# Emerging Battery Storage Technologies

Insights into emerging battery storage technologies and their impact on design factors for battery casings

**AZL** Aachen GmbH



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Image 2: Key-Visual "Emerging Battery Storage Technologies" © AZL Aachen GmbH



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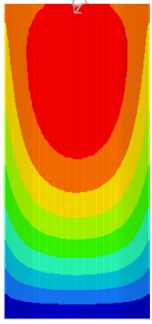
Dr. Florian Meyer | Development of body structure CAE methods / testing Properties @ Audi AG

Image 3: Testimonial Dr. Florian Meyer © Audi AG



Image 4: Real Cell Testing © AZL Aachen GmbH

### Bottom cooling



### Side cooling

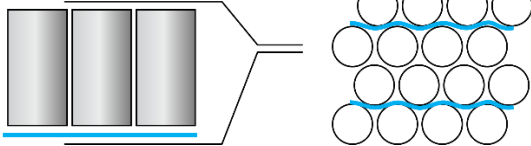
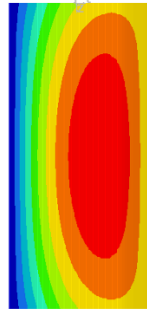


Image 5: Cooling Simulation © AZL Aachen GmbH

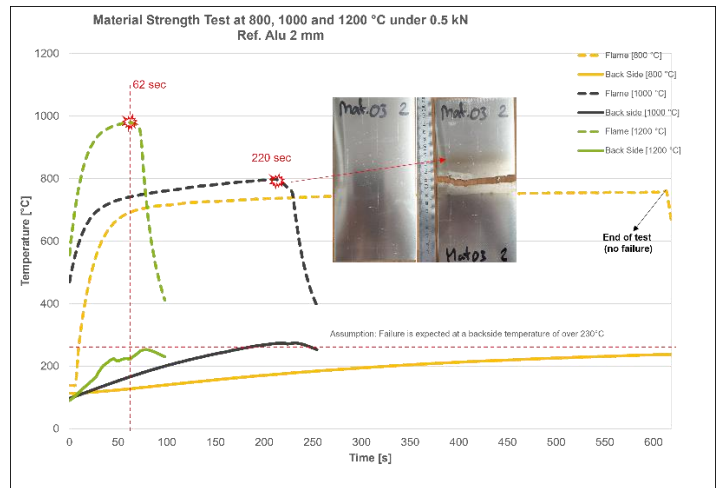


Image 6: Material Strength Test © AZL Aachen GmbH



Image 7: Portrait Warden Schijve © AZL Aachen GmbH



Image 8: Portrait Philipp Fröhlig © AZL Aachen GmbH

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As a close partner of RWTH Aachen University, one of the world's leading universities in the field of production technology, AZL Aachen GmbH specialises in lightweight construction. As a central, interdisciplinary solution provider, AZL Aachen GmbH supports its customers in analysing, understanding and developing products, processes and markets. AZL Aachen GmbH offers platforms and projects to exchange knowledge and efficiently drive innovation through shared effort. Its services include studies and benchmarks, technology consulting and development projects. AZL Aachen GmbH utilises its strong network on the RWTH Aachen Campus, one of the largest research landscapes in Europe for companies and research institutions.

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