

COMET MODULE

[COMET MODUL BATTLAB – HIGH PERFORMANCE BATTERY SYSTEMS DRIVEN BY POLYMER SCIENCE AND VIRTUAL MATERIAL ENGINEERING]

Main location: Leoben (Steiermark)

Other locations: None

Thematic area: Energy & Environment

(according to www.ffg.at/comet/netzwerk)



Thematic focuses

- Development of functional case coatings for use as a complementary safety system in battery management systems
- Characterization of the thermal properties of polymer release coatings under operating conditions of battery systems
- Development of machine learning models to predict the ageing processes in battery systems
- Implementation of a multi-scalar, multi-physical virtual system for the simulation of battery systems

Planned realisation and outcomes

1. Safe battery systems
 - a. Complementary monitoring systems based on tracer molecules for faster and more robust detection of thermal runaway of individual cells in a battery stack (faster warning in emergency situations)
 - b. Safer battery stacks based on validation of separation layers to inhibit the thermal chain reaction in an entire battery stack starting from single thermal runaway cells (less potential for damage and danger in emergency situations)
2. Machine learning models for better prediction of aging processes in batteries
 - a. More accurate prediction of the state of charge (SoC) and state of health (SoH) of battery cells (accurate measurement of battery condition)
 - b. Derivation of the aging of battery cells in use by means of accelerated aging experiments (better prediction of the life cycle behavior of battery cells)
3. Digital twin of a battery system in a virtual system
 - a. Simulation of the thermomechanical properties of a battery system based on component properties (better prediction of possible damage due to e.g. accidents)
 - b. Simulation of the degradation of thermomechanical properties of a battery system due to ageing (evaluation of possible risks over the lifetime)

COMET FACTSHEET

Selected company partners (max. 10):

1. 4a engineering GmbH
2. AVL List GmbH
3. BMW AG
4. hofer powertrain GmbH
5. Isovolta AG

Selected scientific partners (max. 5):

1. AIT Austrian Institute of Technology GmbH
2. Budapest University of Technology and Economics
3. Fundación CIDETEC
4. Montanuniversität Leoben
5. Virtual Vehicle Research GmbH

Selected international¹ partners (max. 5):

1. BMW AG
2. Budapest University of Technology and Economics
3. Fundación CIDETEC
4. hofer powertrain GmbH

Duration: 01.01.2024 bis 31.12.2027 (4 years)

Staff employment: 8.45 FTE, thereof 8.35 scientists

Management: Dr. Johannes Macher, Executive Manager
Dr. Peter Fuchs, Division Manager
Dr. Elisabeth Ladstätter, CEO
Prof. Dr. Wolfgang Kern, CTO

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Status 03.03.2024

The COMET Module is funded within COMET – Competence Centers for Excellent Technologies – by BMK, BMAW as well as the co-financing federal province Styria. The COMET programme is managed by FFG.

www.ffg.at/comet

¹ Partners with headquarters outside Austria