



Virtual Vehicle is a leading international R&D center for the automotive and rail industries. The center focuses on advanced virtualization of vehicle development. This linking of numerical simulations and hardware testing leads to a powerful HW-SW system design.

Master Thesis

“Characterize heat balance during thermal runaway of large Li-Ion cells and cell-stacks”

Ref.Nr. E_129

Master Thesis

In the recent years both, the electromobility and the Li-ion battery technology showed impressive progress. The cell manufacturer achieved an increase of the energy density of mass-produced cells above 300 Wh/kg. With higher energy density new safety challenges arise. In the worst-case failure of a cell, the Thermal Runaway (TR), the stored energy is released in an exothermic reaction. The heat is released through heat conduction to adjacent elements, through outflow of gas and through ejection of hot particles.

The goal of the thesis is to quantify the three heat releases and to make a heat balance of the whole reaction. For this a sample holder with heat capacities to capture the heat must be designed, TR experiments must be done and the heat balance must be calculated from the measurements.

TASKS

- Design a sample holder for cell-stacks with Autodesk Fusion360
- Order the components and assembly of the sample holder
- Assist during Thermal Runaway experiments
- Calculating the heat balance of a TR experiment (by using an already established analysis workflow)

PROFILE

- Studies in chemistry, physics, mechanical engineering or similar
- Interest in designing of test-stands and mechanical design
- Interest in mechanical assembly of the test stand, working in Laboratory and workshop environment
- Interest in automatisisation and data analysis (Labview, Python)
- Interest in Li-ion battery technology

OFFER

- Collaboration and contribution in an engaged, dynamic team
- Interesting work in an international research center
- **Paid** Thesis
- Mentoring program for new employees'
- Diverse sports and health activities regularly
- Corporate Events

For technical questions, please contact

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