



**virtual**  **vehicle**

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. About 300 people are now employed at our site in Graz - their expertise enables the efficient development of affordable, safe and environmentally friendly vehicles.

## Master Thesis

### “Comparison of the thermal runaway behavior of single large Li-ion cells and cell-stacks”

Ref.Nr. E 143

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 compare and understand the different battery failing behaviour of single battery cells versus cell-stacks. An experiment series will be done in an already existing test-stand and with existing methods. The outcomes of the experiments will be compared.

### Your 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.
- Analysis of the experiments.
- Compare the experiments, find correlations.

### What we expect from you

- 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.

### What we 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:**

Christiane Essl or Andrey Golubkov

+43-(0)316-873-9639

## APPLY NOW and JOIN OUR TEAM

Contact: Katharina Fink | +43 316 873 9016 | Inffeldgasse 21a, 8010 Graz | [www.v2c2.at](http://www.v2c2.at)