Master-Thesis

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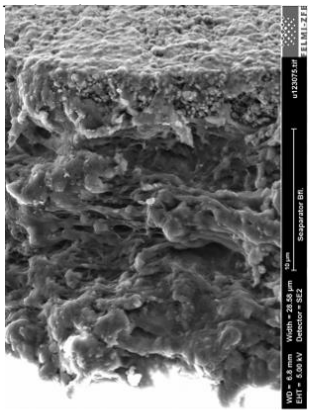

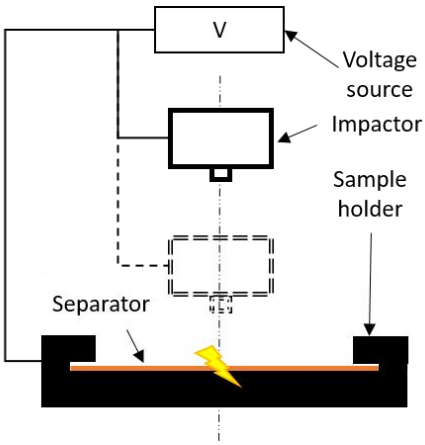

Evaluation of the short circuit behavior of fresh and aged battery separators and derivation of failure criteria for detailed finite element battery models

Background:
In the last decades due advances in material development and innovative design, Li-ion batteries have become an attractive candidate as energy storage system for the automotive industry. The complexity of lithium ion batteries however brings new challenges for any electric vehicle manufacturer. A deeper understanding of the electrochemical behavior and the ongoing processes during battery charging and discharging can prevent the occurrence of hazardous events like internal short circuits and premature battery failure. The funded research project called “SafeBattery” is co-financed by seven industrial partners with the objective to give a research contribution to the understanding of the hazard conditions of Li-ion batteries under various mechanical loading conditions.
Main objective of this research is the derivation of failure criteria for lithium-ion battery separators, when damaged by lithium dendrites or by an external mechanical load.

Tasks:

- Literature research on dendrite formation and lithium-ion battery failure
- Conceptualization and construction of measurement setup
- Planning and fulfillment of experimental measurements
- Data evaluation for fresh and aged samples in order to derive failure criteria for detailed FE battery models

Requirements:

- Interest on renewable energies and e-mobility
- Degree on mechanical engineering or similar
- Interest in conducting practical work
- Basic knowledge of electric circuits and current flow behavior
- Propensity to team work and cooperation
- Ability to self-organizing and structure simple tasks

Organizational:

- Start: immediately as possible
- Duration: 6 - 8 Months
- Languages: English (mandatory), German (optional)
- Remuneration: 2500€
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