

**CARISSMA**Institute of Electric,
Connected and Secure MobilityTechnische Hochschule
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Thesis

“Impact of Cell Holder Design on the Reproducibility of Electrochemical Impedance Spectra in Lithium-Ion Cells”

Description:

At the C-ECOS institute, impedance spectroscopy measurements are routinely performed using a Zahner impedance analyzer together with a standardized cell holder. This combination provides highly reproducible results, primarily because of the mechanical and electrical conditions. However, when measuring cells that do not fit into this standardized holder, alternative contacting methods must be used. In these cases, we have repeatedly observed significant deviations in the impedance spectra. These variations can often be traced back to differences in cell contacting, such as changes in contact resistance, mechanical stability, the geometry of the current path, or the variability introduced by manual placement. Since impedance spectroscopy is extremely sensitive to such influences, even small differences in contacting can distort key features of the spectrum. Reliable interpretation of impedance data, requires well-characterized and reproducible contacting conditions, especially for cells of different formats. The goal of this work is to systematically investigate various cell contacting methods, quantify their impact on the measured impedance, and identify which configurations produce stable and reproducible results.

Your tasks:

- Literature research on impedance spectroscopy on lithium-ion cells
- Market analysis of commercially available cell holders
- Experiments with different cell holders

Your profile:

- Basic knowledge of measurement techniques and lithium-ion batteries
- Interest in experimental work and data analysis
- Reliable and systematic working methods

Interested? Any questions? - Contact us!

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