AVL DITEST

FH JOANNEUM
Elektronik und
Computer Engineering

BA Seminar

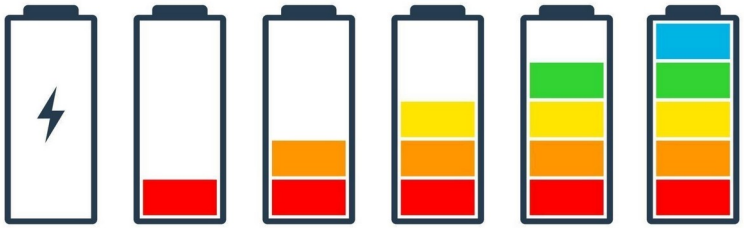
SS 2022

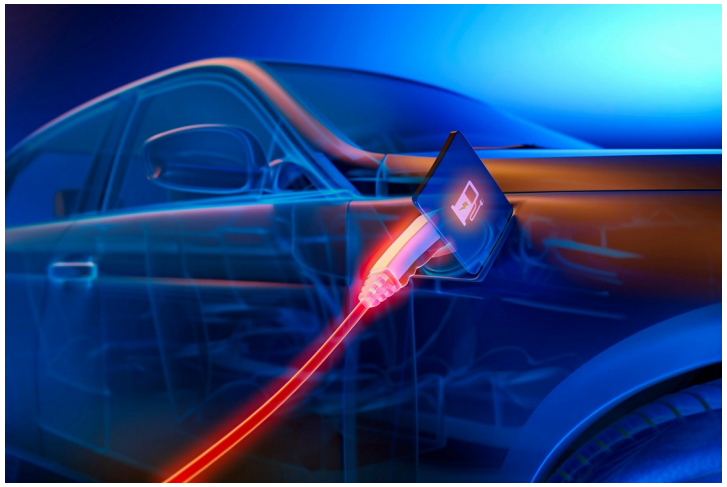
Elektronik und Computer Engineering
Florian Zwittnigg

Determining the internal resistance of a lithium ion battery

Motivation

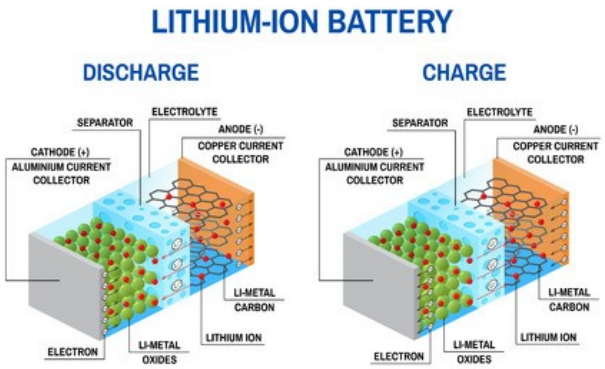
- Condition of a Lithium Ion Battery
- Information about durability of the Battery
- Simple and fast measurement

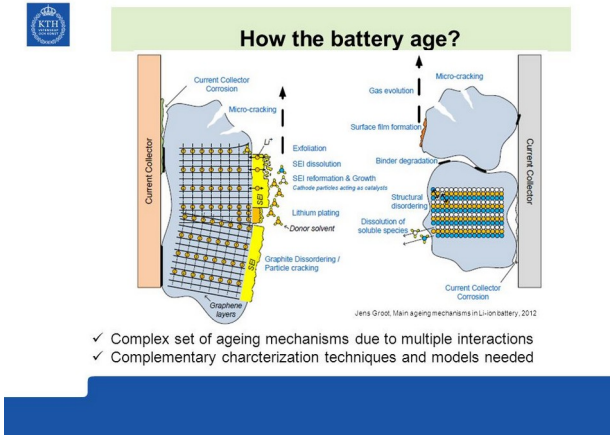




Lithium Ion Battery general information

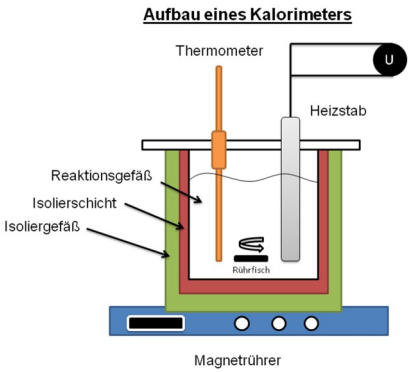
- Build of a Lithium Ion Battery
- Aging Process
- Meaning of the internal resistance





Methods to determine the internal resistance of a Lithium Ion battery

- Hybrid Pulse Power Characterization (HPPC)
- Galvanostatic Intermittent Titration Technique (GITT)
- Electrochemical Impedance Spectroscopy (EIS)
- Calorimetric Measurement
- DC Charging Method
- Parameterization using current pulses



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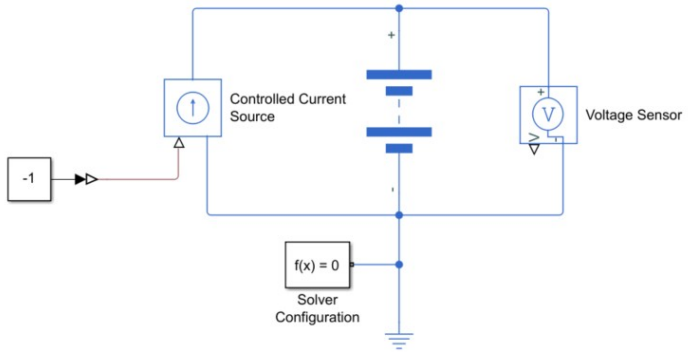
Findings

- The internal resistance gives use information about the state of charge
- And about the ability how much current can be delivered by the battery
- Best method is the parameterization using current pulses
- Because it is a fast and accurate measurement
- Other measurements are to complex or take to much time respectively need expensive measureng devices

Outlook

- Model building in Simulink
- Equivalent electric circuit to reality
- Data Evaluation of the system response
- Comparison of the results with the findings from the literature



Outlook

- Measurements with available hardware
- Device IRP120
- Measurement of 400V System
- Measurement of single cells
- Comparison between Matlab results and measurement results