ELKRAFTTEKNIK@CHALMERS

master thesis work

Measure and model the electrochemical properties of Li-ion batteries

Goal:	Build an electrochemical model of a Li-ion battery with parameters identified from various electrochemical measurements.
Background:	The battery is a complicated electrochemical system and it is important to have a physical based model to predict its electrical performance. There is a list of electrochemical parameters that are used in a battery model and the variables are highly coupled, which makes it challenging to identify all the parameters. In a traditional battery system, only the voltage of the complete cell can be measured and thus it is not possible to separate the behavior of each electrodes. Therefore, a three-electrode system is to be used in this project.
Plan:	Perform literature studies. Build full cells, half cells and three-electrode cells with selected materials. Perform various electrochemical measurement, such as galvanostatic cycling, GITT, ICI, EIS and identify electrochemical parameters from the measurement. Build an electro-thermal model in COMSOL Multiphysics or MATLAB. Perform simulation and compare the results with measurements. If time allows, aging test and modelling can be performed.
Number of Students:	2
Start time:	January 2021
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