

## MASTER THESIS IN THE FIELD OF ELECTROCHEMICAL ENERGY STORAGE

### LITHIUM-ION CAPACITORS



Lithium-ion capacitors are energy storage devices, where one electrode works as battery (generally lithiated graphite anode), whereas the other electrode stores charge in the electric-double layer (made from nanoporous carbon materials). Hybridization of two electrodes results in a device with specific energy comparable to batteries and specific power comparable to supercapacitors. Moreover, the charge/discharge curves of a lithium-ion capacitor resemble those of electric double-layer capacitor (EDLC).

Objective of this work is to search and implement sacrificial lithium salt with low band gap from which lithium could be easily extracted below the electrolyte decomposition potential (ca. 4.0 V vs Li/Li<sup>+</sup>). Then laboratory-scale lithium-ion capacitors will be assembled and their cycling behavior studied. The student will investigate the charge storage mechanisms at both electrodes with electrochemical and spectroscopic methods.

**Starting date:** as soon as possible, duration 6 months

#### **For more details, please contact:**

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