

Energy storage: Lithium-ion/Sodium-ion batteries, Flow batteries

Rechargeable metal-ion batteries are central to our way of life. Lithium-ion batteries are commonly used in portable devices and electric vehicles. Efficient energy storage is essential for the implementation of intermittent renewable energy sources (solar, wind ...) into the electrical grid. Rechargeable battery technology can be used to balance electricity supply and demand. Shortening of the lithium resources might make sodium-ion batteries a suitable technology for large-scale stationary energy storage where lower energy density is less a concern than cost. Other promising battery technologies such as flow cells are emerging. The fundamental difference between conventional batteries and flow cells is that energy is stored not in the electrode material but in the electrolyte.

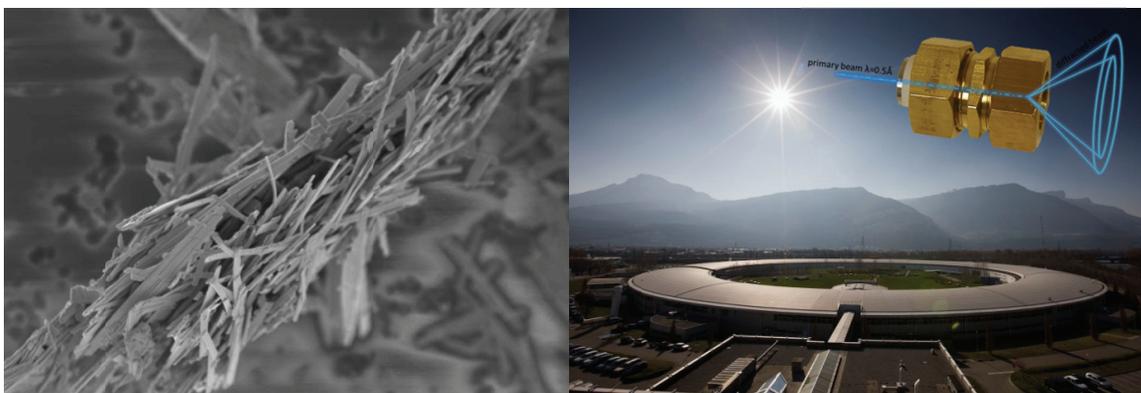
NAFUMA is working with the synthesis and optimization of new electrode materials for both lithium- and sodium-ion batteries. We are aiming for materials with high energy and power density, suitable charge rates, long cycle life and increased safety. Batteries are complex systems which require a broad range of expertise within material synthesis and characterization.

Examples of this:

- Material synthesis (solid state chemistry, wet chemistry, sol gel, hydrothermal, ball milling)
- Material characterization (Elemental Analysis, Thermogravimetric Analysis, X-ray Diffraction, Scanning Electron Microscopy, Magnetic property measurements)
- Preparation of electrodes
- Building test cells
- Broad range of electrochemical characterization techniques.
- Study the structural and chemical evolution of electrode materials under working conditions using synchrotron radiation (European Synchrotron, Grenoble, France)
- DFT calculations

What you will learn:

- You will become an expert in several of the bullet points above
- How to characterize your materials using the best methods available
- How to evaluate batteries and their performance
- Become a key part of the NAFUMA team and work closely with the researchers



Research group: NAFUMA; **Contact:** helmerf@kjemi.uio.no or jonas.sottmann@smn.uio.no

