Switchable iron complexes as active species for redox-flow batteries: Spin Batt

Initiative: "Experiment!" (beendet)

Ausschreibung: Explorative Phase

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Long-term large-scale storage of electrical energy is crucial for a widespread use of renewable energy sources such as solar power and wind power as they are strongly fluctuating. Redox-flow batteries store the electrical energy in redox equivalents of redox-active species in solution (anolyte and catholyte). They offer several advantages compared to solid state battery systems as they provide a flexible layout, long cycle life, fast response times, and no harmful emissions. The intrinsically limited energy density of flow cells is compensated by the highly modular layout allowing, in principle, for unlimited storage capacities and spatial uncoupling of (dis-)charging and storage. The author proposes the integration of spin-switchable iron complexes for novel types of redox-flow batteries using waste heat to increase the storage efficiency by heat-to-electricity energy conversion. This will be realized by tuning the redox potentials of the iron complexes via their spin state as a function of temperature. This approach uses the benefits of the abundant element iron as redox active switchable species and aims to use environmental benign water as solvent.

Projektbeteiligte

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Design of a Flexible but Robust Setup for Temperature-dependent Electrochemistry down to Cryogenic Temperatures