

# Degradation of carbon based electrodes for Vanadium-Redox-Flow-Batteries

---

**Period:** 01-07-2017 to 31-05-2020

**Funding:** BMWi

**Contact:**

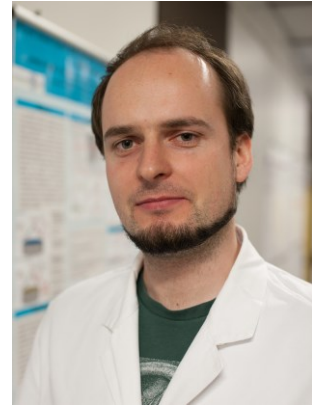
M.Sc. Jonathan Schneider

Raum: 15.09

Telefon: (030) - 838 910429

Email: jonathan.schneider(at)fu-berlin.de

**ORCID:**



---

## Publications

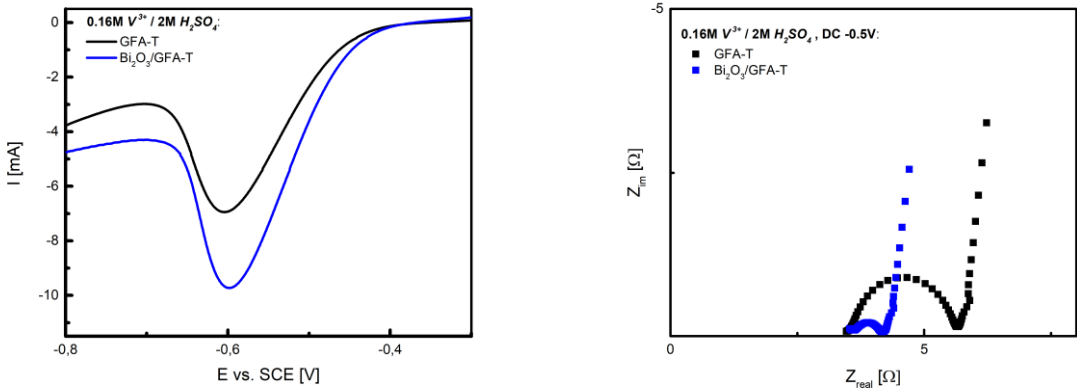
### Project Summary

Due to the use of highly corrosive electrolytes the components of a **Vanadium Redox Flow Battery (VRFB)** suffer from a slow but steady **degradation**. Within the BMWi-Project „DegraBat“ these degradation processes are studied systematically for the first time.

My research interest is to understand, how these processes take place at the **electrodes** and how they affect the efficiency of the battery. For these studies the main method of choice is the **Electrochemical Impedance Spectroscopy (EIS)**.

Furthermore I try to enhance the durability of commercially available electrodes at the negative side by **modification** with metal oxides, such as  $\text{Bi}_2\text{O}_3$ . Within my master thesis I could already show the positive effect, this modification has on the reduction of V(III) (see figure). It can be seen from an increased peak current

in the voltammogram (left) and from a decrease in charge transfer resistance which manifests in the reduced radius of the corresponding semicircle in the impedance spectrum (right).



Linear-sweep-voltammogram (left) and impedance spectrum (right) for the reduction of Vanadium(III) to Vanadium(II) at heat treated carbon felt (GFA-T) and heat treated felt which was modified with bismute oxide ( $\text{Bi}_2\text{O}_3/\text{GFA-T}$ )