



e-conversion



# **Sonderseminar**

**Montag, 13. Mai 2019**

**16:00 Uhr**

**WSI, Seminarraum S 101**

## **“Electrochemical and photoelectrochemical water splitting, biomass conversion, and desalination”**

Our research employs electrochemistry as the primary synthetic tool to fabricate a variety of solid state materials as thin-film type electrodes and catalysts. These materials are selected for use in electrochemical and photoelectrochemical cells that produce fuels, building block chemicals, and clean water using renewable energy sources. We develop electrodeposition-based synthesis strategies to design and optimize electrode compositions and architectures to achieve desired electrochemical, photoelectrochemical, and catalytic properties. Our most established core research area is the development of photoelectrochemical cells for solar water splitting. This project involves the synthesis and understanding of photoanodes, photocathodes, hydrogen evolution catalysts, and oxygen evolution catalysts. The optimization of the interface between photoelectrodes and catalysts is also a critical research area. In this presentation, we will discuss various strategies to improve photoelectrode performances and photoelectrode/catalyst interfaces using a BiVO<sub>4</sub> photoanode as an example. We will also present electrochemical and photoelectrochemical processes that we have been developing to make key building block chemicals via oxidative and reductive biomass conversion where water is used as the oxygen or hydrogen source. Finally, we will briefly introduce our new research direction where we develop electrochemical and photoelectrochemical processes to enable seawater desalination. By showcasing three different research areas, all based on electrochemical and photoelectrochemical processes, this presentation will demonstrate the versatility and the enormous potential of electrochemical and photoelectrochemical applications.

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