

Bachelor Thesis

Design and characterization of enzyme-modified electrodes for sensor and fuel cell applications

Flexible start date

Located at the Chair for Energy Process Engineering, a focus group for *Bioelectrocatalysis* is currently being established as part of the new assistant professorship for Distributed Energy Process Engineering. Biological catalysts (enzymes, microorganisms, etc.) offer various areas of application such as medical technology, waste treatment and environmental technology, and they have numerous advantages over conventional catalytic systems. The “building blocks” of biological origin of the bioelectrochemical systems are often less sensitive to contamination and act more specific in heterogeneous substrate media. Their origin from renewable sources, the mostly biocompatible, non-toxic properties, as well as the possible operation under moderate conditions (pH, temperature, pressure) make electroactive biocatalysts particularly interesting for applied fundamental research on alternative energy systems.

In this project, the composition of enzyme-modified electrodes is to be studied and optimized. In this regard, the design of an innovative electrode architecture based on bio-nano hybrid structures is to be developed and validated.

Tasks:

- literature research on bioelectrochemical systems, especially on crosslinking methods of enzyme electrodes
- modification of electrode surfaces with redox enzymes
- test planning and execution for testing the electrodes with various analysis methods
- evaluation of the measurement results
- written documentation of the work and preparation of the results

Requirements:

- motivated, independent way of working
- enjoying experimentation on a small scale
- no fear of pipettes
- working language: English or German

Literature:

- A. Trifonov et al., ACS Nano 2013, 7, 12, 11358–11368, 2013
<https://doi.org/10.1021/nn405218x>



Contact:

Prof. Dr. Katharina Herkendell
Room 2.1.21, Fürtherstr. 244f, 90429 Nürnberg
Phone: +49 911 5302-9032
E-Mail: katharina.herkendell@fau.de