

## Bachelor Thesis

# Construction of a small bioelectrochemical test stand for the characterization of bio-electrodes

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### Possible start October - December

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, a first test stand for the characterization of enzyme-modified electrodes is to be set up. The electrochemical analysis is carried out primarily by means of cyclic voltammetry (introduction will be given). The geometry and substrate supply of the measuring cell are to be characterized in parameter studies.

### Tasks:

- literature research on bioelectrochemical systems, especially on enzymatic fuel cells and cell geometries
- construction of an electrochemical test stand on a milliliter scale
- test planning and execution for testing bio-electrodes by varying different parameters
- 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
- interest in electrochemistry
- working language: English or German

### Literature:

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



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