Karlsruher Institut für Technologie

KIT-Campus Süd | IAB | Geb. 30.44 | Fritz-Haber-Weg 2 | 76131 Karlsruhe

Institut f. Angewandte Biowissenschaften (IAB)
Abteilung Angewandte Biologie
Prof. Johannes Gescher

Fritz-Haber-Weg 2
76131 Karlsruhe

Telefon: +49 721-608-47823
Fax: +49 721-608-41941

Contact: Dr. Gunnar Sturm
E-Mail: gunnar.sturm@kit.edu

Web: www.gescher-lab.de

PhD position in Applied Microbiology

Project titel: **Bioelectrochemical system for flexible biogas production**

Project description: The objective of the sub-project is twofold. On the one hand, a stable bioelectrogenic is to be established on the anodes of a bioelectrochemical system, which allows the oxidation of organic material with an electrode as electron acceptor. The aim is to maximise current densities. Since this can be achieved in particular by the colonization of specific electroactive microorganisms, a new type of application will be developed with which these organisms can be "sprayed" onto the electrodes like a dye.

On the cathode side of the reactor hydrogen is produced. The second aim of the project is to use this hydrogen to produce the platform chemical butanediol. For this purpose, an existing strain is to be genetically modified in order to produce the desired end product successfully and, at the same time, to achieve the best possible result of being productive with long-term stability.

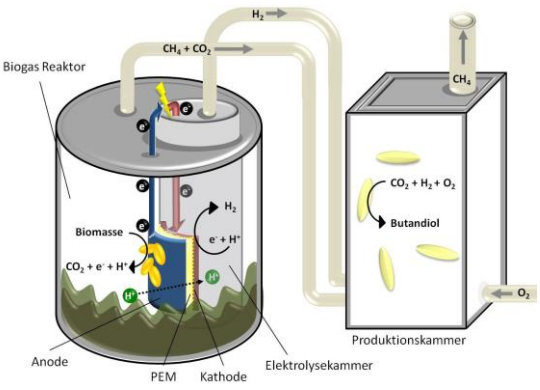

Fig. 1: Flexible production of biogas regulated an electrode. In the biogas reactor, the biomass is fermented and converted into methane and carbon dioxide. By applying a potential to the anode, electrons can be transferred to the electrode using so-called exoelectrogenic bacteria. This reduces the load of organic acids. The electrons flow to the cathode and the protons can enter the electrolysis chamber via a proton exchange membrane (PEM). At the cathode, hydrogen is obtained from electrons and protons by electrolysis. Hydrogen and the raw biogas are fed into the production chamber. Here, microorganisms can generate a valuable substance (e.g. butanediol) from hydrogen and carbon dioxide. This also partially removes the carbon dioxide from the biogas mixture, which facilitates biogas processing.

Interested applicants are asked to contact Dr. Gunnar Sturm for further details.

gunnar.sturm@kit.edu | www.gescher-lab.de