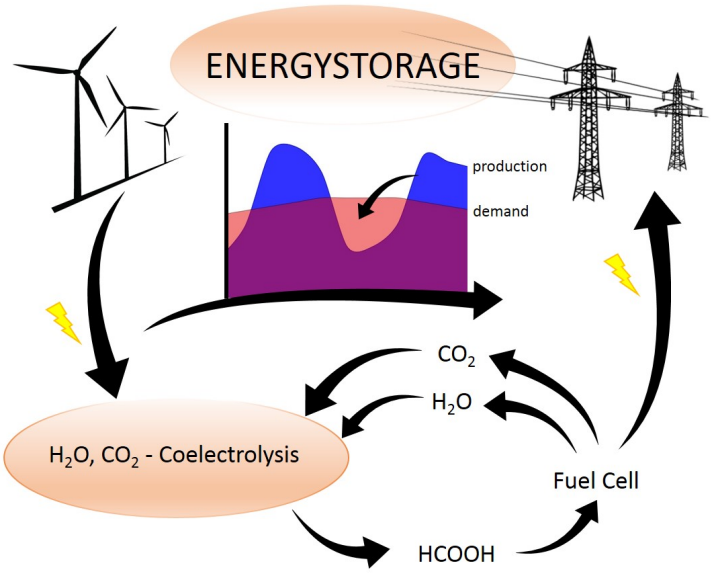
University of Stuttgart
Germany

Institut für Technische Chemie
Prof. Dr.-Ing. Elias Klemm

Bachelor-/Masterarbeit, Forschungspraktikum:

Reaction Engineering of a CO_2-based Hydrogen Battery

The present work focuses on the **electrochemical reduction of CO_2 to formic acid** in the context of **chemical energy storage**. The development of a **hydrogen battery** is an important step to enable the future energy supply based on **renewable energy sources** that depend on storage capacities due to their volatile nature. It is desired to apply **molecular catalysts** for the hydrogenation and the respective dehydrogenation reaction of CO_2 that are comparable with the charge and discharge process of a battery.



Current Research:
The desired reaction pathway is a conversion of CO_2 to formic acid using **molecular Ru-catalysts** and an implemented hydrogen source, following the principle of **transfer hydrogenations**. Research is necessary to understand the reaction and the system better and to evaluate conditions that lead to a higher efficiency of the process. The reaction will be transferred to an **electrochemically** controlled process. Therefore it is beneficial to **immobilize the molecular catalyst**, which will be done in cooperation with the group of Prof. Dr. Plietker. Furthermore it is planned to transfer the process via a continuous- towards a microfluidic operation mode, preferably at ambient conditions.

Possible Tasks:
Workpackages include the general investigation of the system regarding both kinetics and reaction engineering aspects. Further effort is necessary in applying immobilized catalysts as well as the transformation of the process towards an electrochemical reaction control.

Bei Interesse einfach bei mir vorbeikommen (0-816) oder eine E-Mail schreiben.

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