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| <input type="checkbox"/> Bachelor thesis          | <input type="checkbox"/> theoretical             |
| <input type="checkbox"/> Construction exercise    | <input checked="" type="checkbox"/> experimental |
| <input checked="" type="checkbox"/> Master thesis | <input type="checkbox"/> constructive            |

## Topic: **Development and characterization of graphene oxide supported catalysts for the alkaline direct ethanol fuel cell**

In the last decades, the direct ethanol fuel cell (DEFC) has gained a lot of attention as alternative power source and an auspicious technology for a clean energy supply in mobile and stationary applications. In comparison to equivalent technologies, DEFCs promise advantages regarding high performance, low toxicity and environmental friendliness as well as robustness. Catalyst and membrane development are the challenges that need to be addressed in order to enhance the performance, durability and costs of the DEFC. In this project, the catalytic activity and long-term stability of the catalysts is improved by using functionalized GO materials as carbon support material.

The **research work** includes:

- **Development of functionalized graphene based non-noble metal containing electrocatalysts** for ethanol oxidation and oxygen reduction reaction using different synthesis methods
- **Electrochemical characterization** of the catalysts (RDE-CV/CA)
- Comprehensive **physicochemical characterization** (ICP-OES, XRD, XPS, SEM etc.)
- **Membrane electrode assembly development and single cell testing**

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**Starting date:** Immediately (minor employment)

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