



MAX-PLANCK-GESELLSCHAFT



MAX-PLANCK INSTITUT FÜR
CHEMISCHE ENERGIEKONVERSION

Master Thesis

reaction engineering | technical chemistry | process intensification

Our group:

The Multiphase Catalysis Group in the department of Molecular Catalysis at the Max Planck Institute for Chemical Energy Conversion (MPI CEC) is currently looking for Master students interested in conducting research in the field of catalysis and reaction engineering.

Our research is focused on green chemistry, catalysis and process intensification. We work at the interface between chemistry and engineering and therefore offer a very versatile work environment. Projects include the development of new reactions, design of suitable catalysts, and scale-up of processes into continuously operated miniplants.

Your thesis:

Homogeneous transition metal catalysts are known for their high selectivity, activity, and defined structure. However, the recycling of the oftentimes expensive metals can be challenging. One solution is to immobilize the catalyst in a second liquid phase immiscible with the products, so that the recycling is achievable using a simple phase separation. In some systems, especially if the catalyst is immobilized in water (aqueous biphasic catalysis), the reagents may show an extremely low solubility in the catalyst phase. Here, the literature postulates that the reaction does not take place in the catalyst phase itself, but at the interfacial layer between catalyst and reagent phase.

The objective of the thesis is to study the phenomenology of this type of chemical reaction systems and to quantify the influence of the interfacial area and mixing using innovative technologies such as high-pressure endoscopy and 3D-printing.

What can you expect?

- Work with a miniplant at elevated pressures (up to 100 bar)
- Modify the present miniplant if necessary
- Utilize high pressure endoscopy and automated image evaluation
- Conduct GC and ICP-MS measurement

Requirements:

- Interest in the field of technical chemistry and homogeneous catalysis
- Good level (B2) of spoken English
- Basic understanding of reaction kinetics and mass transfer

If this description sounds like you and you are in for doing your thesis with us, do not hesitate to contact me with a short description of your background and interests and why you want to join the team:

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