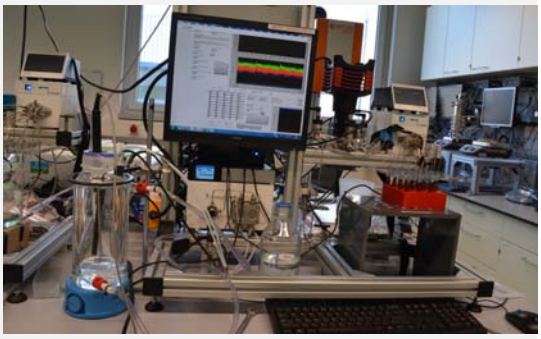
PhD Position (Doktorarbeit)

Project

This PhD project builds on ongoing research projects in the area of photocatalytic membranes at IAMT. Current work will be expanded to (select) novel materials and membrane preparation methods for photocatalytic membrane development. The project will focus on i) photocatalyst selection, looking beyond the most commonly used materials, ii) explore options of catalyst deposition and coating, iii) investigate system design from small-scale to potentially pilot scale process design - with one of the challenges being the integration of the light source, and iv) an application to micropollutant removal. Modelling aspects are open to exploration at molecular and process scale.

There are many aspects of this project, that require in-depth research and development, including:

- Can a nanofluidic system fully degrade contaminants in-situ in a membrane with photocatalytic functionality and how can full degradation be verified?
- What are the most suitable photocatalytic material characteristics for micropollutant degradation in water and what are selection criteria/tools?
- What are the mechanisms behind in kinetics in membrane photocatalysis and how can such mechanisms be quantified?



The PhD project will be largely experimental and will begin with an identification of a set of research questions based on detailed literature survey. The preliminary research proposal required for application (with a timetable for the 3 to 4 year research project) will be further expanded to 4 main experimental chapters. Required equipment will be set up and further development of relevant analytical methods will follow. Establishment of suitable models to explain the results obtained drawing of interdisciplinary and potentially multi-scale approaches will be an opportunity to integrate experiment and model. Execution of the research plan through conducting of experiments, sample and data analysis and write up of results for scientific publication are part of the PhD process – a journey to become an independent researcher!

Throughout the project, there will be multiple opportunities for cooperation with internal and external partners, supervising bachelor and master students, giving oral presentations at conferences, writing high-impact journal articles, as well as sharing your knowledge via teaching.

Qualifications

You will most likely already hold a Masters in Chemical, Process, Environmental Engineering, or equivalent. You are a naturally curious person who is eager to learn more and has a strong interest in research. Experience with membrane filtration systems (of any scale) is a definite advantage, as well as being comfortable in specifying system components and sound experimental problem solving skills – as well a good common sense. Excellent English language proficiency is essential, basic German language skills of advantage.

KIT

KIT is one of the biggest research institutions worldwide and has access to state-of-the art research facilities resulting from the merger of the National Research Centre of the Helmholtz Association and the former Technical University of Karlsruhe. This project is hosted by the Institute for Advanced Membrane Technoloy (IAMT) that collaborates on the topic of photocatalysis and renewable energies with Prof. Dr. Bryce Richards who leads the Nanophotonics for Energy group within the Institute of Microstructure Technology (IMT) and Light Technology Institute (LTI). The PhD will be registered in the Faculty of Chemical and Process Engineering.

Contact

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Applications

Please send applications with CV, publication list and your contribution to the publication (if relevant), academic transcripts, degree certificates, contact details for three references and a preliminary research proposal. A valid driver's licence will be required.