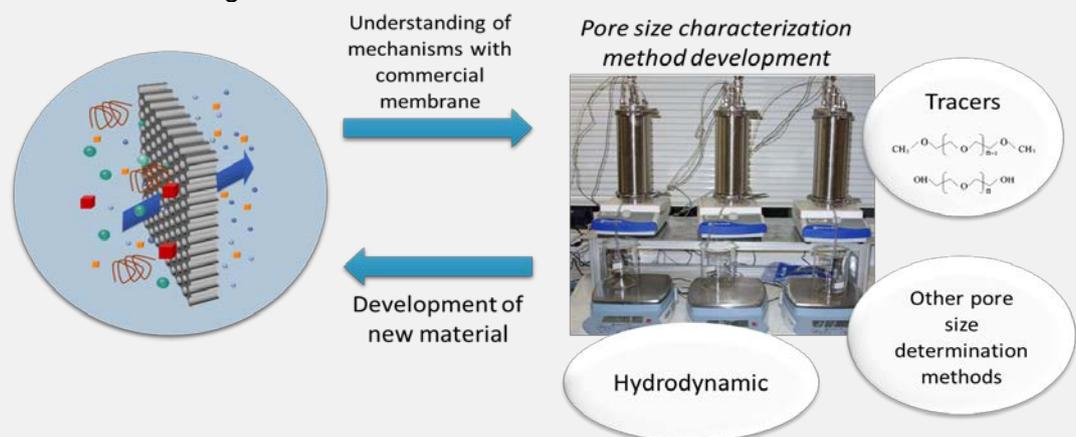


Diplomarbeit / Masters Project

Project Summary:

Development of analytical procedures for nano- (NF) and ultrafiltration (UF) membranes pore size characterization

Membrane characterization is an essential aspect for the development of more efficient membrane materials and better understanding of molecular retention mechanisms at nano-scale. Pore size determination is one of the most important membrane characteristics. Hence the development of reliable methods using dead-end filtration cells, examination of the influence of operational parameters such as hydrodynamics and the limitation of methods at sub-nanometre pore sizes remain a challenge.



The aim of this project is to develop and validate novel experimental procedures to determine the pore size distribution of NF and UF membranes in light of hydrodynamics. These protocols will be applied to both commercial membranes (to understand the mechanism implicate in filtration processes) and to novel membrane materials. The following tasks will be performed;

- Literature review on the topic (organic tracer and salt retention, concentration polarization, stirred cell and crossflow filtration hydrodynamics)
- Development and validation of salt retention and molecular weight cut off (MWCO) protocols in dead-end stirred cells in
- Comparison of the salt retention and MWCO results obtained with other membrane characterisation tools

This topic is embedded in a broader effort of analytical tools development for membrane functional characterization.

Required Skills:

Studies in Chemical/Process Engineering or equivalent (Uni, TH)

Knowledge in analytical chemistry, water treatment processes, hydrodynamics. Willingness to lead or contribute to the writing of a scientific journal publication.

Institute:

Institute for Functional Interfaces (IFG) / Membrane Technology Department

Start Date:

Flexible/negotiable (projects are typically scoped for a duration of 6 months)

Project

Prof. Dr.-Ing. Andrea Schäfer, +49(0)721/608-26906,

Supervisor(s):

Andrea.Iris.Schaefer@kit.edu; <https://www.ifg.kit.edu/english/3803.php>

Professor of Water Process Engineering, Faculty of Chemical and Process Engineering & Head of Membrane Technology Department, IFG