Karlsruhe Institute of Technology

Diplomarbeit / Masters Project

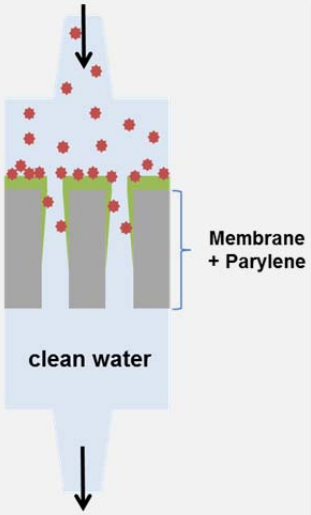
Project Summary:

Composite Membranes for Water Treatment Applications

Pore size distribution, aspect ratio and surface chemistry are essential parameters that influence the performance of semipermeable membranes (permeability, selectivity, durability, wettability, functionality) in various applications such as filtration, distillation or dialysis.

By coating a thin layer on a porous support one can combine the high permeability and mechanical properties of the support with the desired pore size distribution and surface chemistry and thus selectivity of the coated layer. With the introduction of new functional groups to the surface, properties such as hydrophilicity, adhesion, biocompatibility, conductivity, anti-fogging and anti-fouling may be attained. This significantly broadens the market potential of a given material.

The aim of this project is to coat commercially available membranes with a polymer layer using Chemical Vapor Deposition (CVD) Polymerization in order to tune the pore size and/or the chemical properties of the pores.



The following tasks will be performed;

- Literature review on the topic (CVD; membranes for water treatment, composite membranes)
- CVD coating of membranes
- Characterize coating and composite membranes (e.g. Ellipsometry, ATR-FTIR, microscopy, permeability, molecular weight cut off (MWCO))
- Analyse data and write a publication (in English)

The topic builds on previous projects from which some publishable experimental results are available.

Required Skills:

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

Basic knowledge in polymer chemistry, water treatment technologies, membrane technology. Evidenced writing skills in English language, proficiency with Origin Labs software for data analysis and graphing, willingness to lead or contribute to the writing of a scientific publication.

Institute/ Department:

Institute for Functional Interfaces (IFG) / Membrane Technology Department & Department of Advanced Polymers and Biomaterials

Start Date:

Flexible/negotiable

Application Procedure:

Please email CV, transcripts and motivation letter with available time period for evaluation.

Project Supervisor(s):

Dr. Meike König, +49 (0)721 608-2-3052, meike.koenig@kit.edu

Prof. Dr.-Ing. Andrea Schäfer: https://www.ifg.kit.edu/english/3803.php

Prof. Dr. Jörg Lahann: http://www.ifg.kit.edu/english/npb.php