

## Diplomarbeit / Masters Project

### Project Summary

#### Development of nanofiltration well plate device

Membrane materials development requires extensive material characterization methods. These are often time consuming and hence restrict the number of materials that can be tested. 96 well plates have been designed for rapid throughput ultrafiltration (UF) in various laboratory applications (see Figure 1). This is achieved through the application of a vacuum device. The challenge of this project is to construct a device that can operate with an applied pressure such that the function of nanofiltration (NF) membranes can be characterized. Further, the membranes are to be exchangeable such that both commercial as well as self-made membranes can be characterized.

The aim of this project is to design a suitable device and arrange for the manufacture of a prototype. Initial experiments will focus on leak tests, followed by permeability studies of commercial membranes. If successful, the device can be applied to a specific water treatment challenge such as desalination or filtration of micropollutants.

The following task will be performed:

- Literature review on the topic (96 well plate method principles and application for filtration; membrane characterization methodologies used for retention measurements)
- Design a device and discuss preliminary drawings with a suitable workshop
- Set-Up auxiliary equipment (pumps and data acquisition)
- Test the prototype device and report results of leak and permeability tests
- Analyse experimental data and write/co-author a research publication (in English)



Figure 1: 96 well plate UF device  
<https://shop.pall.com/us/en/laboratory/dna-ma-purification/total-ma-purification/acroprep-advance-96-well-filter-plates-for-ultrafiltration-zidgri78m4x>

### Required Skills

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

Basic knowledge in engineering design, technical drawing, fluid dynamics, mechanical process engineering, water treatment technologies, interest in membrane technology. Evidenced writing skills in English language, communication with mechanical workshops, proficiency with AutoCAD (or similar) drawing and Origin Labs data analysis and graphing software, willingness to lead or contribute to the writing of a scientific publication or maybe a patent application.

### Institute/ Department

Institute for Functional Interfaces - Membrane Technology Department (IFG-MT) & Institute of Microstructure Technology (IMT)

### Start Date

Flexible/negotiable

### Application Procedure

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

### Project Advisor(s)

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