

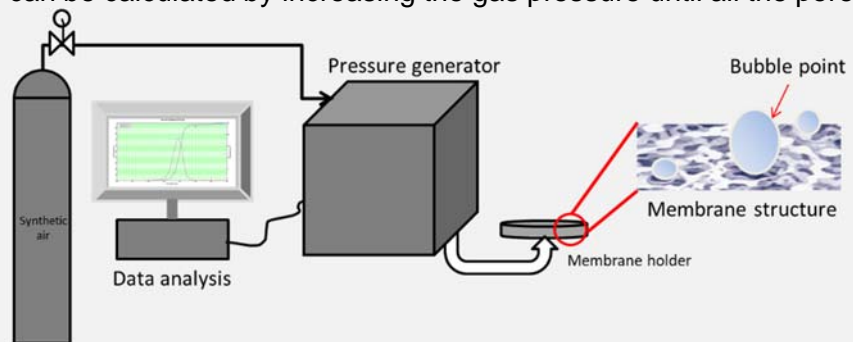
Diplomarbeit / Masters Project

Project Summary

Characterization of membrane defects (pin-holes)

Characterization of membrane properties and integrity (e.g. pore size and size distribution, presence of pin-holes) is of great importance to gain a better understanding of the structural characteristics and retention properties. Membrane defects (e.g. pin holes) compromise membrane performance, leading to the leakage of virus or bacteria in micro- and ultrafiltration (MF and UF) or reduced salt retention in reverse osmosis (RO) and nanofiltration (NF). A number of tools exist to examine membrane integrity. The bubble point method is defined for pore size analysis in MF/UF. The test consists of applying gas pressure through a wet membrane. The pressure at which the bubble gas is reached is defined as "bubble point" and it is correlated with the largest pore size of the membrane (or presence of pin-holes). The smallest pore size can be calculated by increasing the gas pressure until all the pores are dried by the gas flow.

The aim of this project is to carry out a range of experiments with commercial membranes that contain defects in order to



develop a characterization methodology suitable to identify defects of new membrane material. Limitation and sensibility of the method to recognize different pin holes dimension and numbers will be evaluated. The following task will be performed:

- Literature review on the topic (bubble point method principles and application for defects determination; characterization methodologies used for pore size and defects determination, particle challenge tests, molecular weight cut off)
- Perform experiments with the porometer and visualize membrane defects
- Characterize membrane materials for typical performance parameters such as molecule or particle retention
- Analyse experimental data and write/co-author a research publication (in English)

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

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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