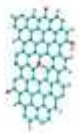
Institut Européen des Membranes



Laboratory, Team : **Institut Européen des Membranes, Montpellier**
Membrane Process Engineering/ Interfaces, Physical Chemistry and Polymers

MASTER THESIS INTERNSHIP PROPOSAL (February-July 2025)

Preparation of nanofiltration (NF) hollow fiber polymer membranes for water treatment

1- Background and objectives

Nanofiltration (NF) membranes represent a fast-growing market particularly in the drinking water production sector or the reuse of treated wastewater. Nearly 90% of the current NF membrane market is made up of spiral wound membranes but the greatest growth potential lies with hollow fibers, notably because they are more compact an easier to clean. Different methods exist to prepare polymeric NF membranes (layer by layer, interfacial polymerization…) but one of the easiest to implement and up-scale to industrial level is the phase separation method. Membrane morphology and characteristics are highly dependent on dope solution formulation and operating conditions of preparation

The objective of this Master Thesis Internship will be to prepare hollow fiber polymer membranes by the phase separation method using a lab-scale spinning apparatus in order to understand and optimized the operating conditions to obtain desired nanofiltration hollow fiber membranes. This project is a collaboration between the Interfaces, Physical Chemistry and Polymers (IP2) and Membrane Process Engineering (GPM) team of the Institut Européen des Membranes.

2- Methodology and approach

The Master Thesis intern will prepare different dope solutions (polymer choice and concentration, solvent, additives, temperature) and will use it to spin hollow fiber membranes in different operating conditions (mono or co-extrusion spinning, temperature, flow rate, air gap height, intern liquid composition…). Preliminary test could be performed for flat-sheet membranes and the spinning machine will also be optimized. Membranes will then be characterized with different tools from the laboratory (morphology, pore size distribution, porosity, mechanical strength, water permeability, retentions…). The aim will be to understand the influence of the different parameters on the properties of the obtained membranes and optimized these parameters.

At the end, the selected processing conditions will be used and adapted to produce hollow fiber membranes at larger scale using a pilot-scale spinning machine and implement them in filtration modules.

3- Skilled required

The candidate must have knowledge and skills in polymer and chemical engineering. Good writing and interpersonal skills are also required. Knowledge or experience in membrane science field would be a plus.

4- Internship supervision

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