

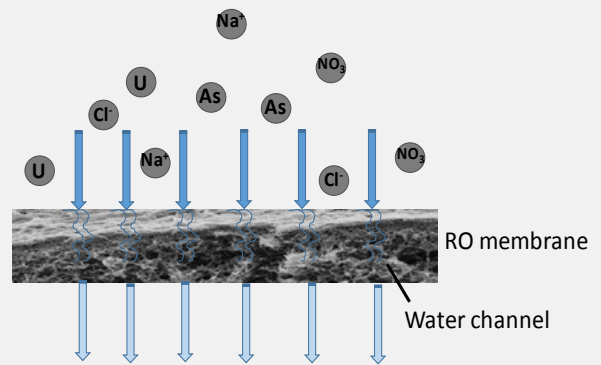
## Diplomarbeit / Masters Project

### Project Summary

### Evaluation of contaminants removal by novel bio-inspired reverse osmosis (RO) membranes

Reverse osmosis (RO) is commonly used in seawater desalination for the production of drinking water, and increasingly used in water reuse for the removal of micropollutants. Due to the high pressure requirements, this process is very energy intensive. The design of novel RO membrane materials able to combine ion selectivity and high permeability is an ongoing challenge. The incorporation of bio-inspired structures (e.g. water and ion channels) within the membrane allows to improve the selectivity of ions transport and contaminants removal by RO.

The aim of this project is to carry out a range of experiments to evaluate the membrane selectivity and removal of water contaminants (e.g. fluoride, arsenic, nitrate, and possibly uranium) by RO membrane functionalized with bio-inspired water channels. The project is carried out in collaboration with the Institut Européen des Membrane (Montpellier, France), where the membranes are produced.



The following specific task will be performed as part of the project:

- Literature review on the topic (water quality with a focus on ionic contaminants like fluoride, arsenic, nitrate and uranium; retention and transport mechanisms of ions in RO; incorporation of water channels in polymeric membranes; membrane characterization (e.g. molecular weight cut off (MWCO), salt retention)
- Characterize the novel RO membrane and benchmark against commercial membranes
- Perform experiments with a micro cross flow system designed for novel membrane characterization to evaluate the contaminants 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 water and polymer chemistry, water treatment technologies, membrane technology. Evidenced writing skills in English language, ability to learn/use Origin Labs software for data analysis and graphing and Endnote for literature management, willingness to lead or contribute to the writing of a scientific publication.

### Institute/ Department

Institute for Functional Interfaces, Membrane Technology Department (IFG-MT)  
Bldg 352, Campus North

### 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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