



DN-MSCA-Horizon Europe
Grant n°101119277

In the frame of the Doctoral Network MSCA Horizon Europe "ChimSep" dedicated to the integration of membrane separations (Organic solvent nanofiltration and membrane distillation) in fine chemistry, 13 PhD projects are funded for 36 months: 8 dealing with membrane science and 5 dealing with homogeneous catalysis.

See all the 13 projects at <https://theses.doctorat-bretagne-ouest.fr/dn-chimsep>

Title- PhD#1: Organic Solvent Nanofiltration (OSN) applied to alkoxy carbonylation media in methanol/ethanol using single step or cascades.
Joint doctorate

Offer description

At University of Rennes ISCR- CIP team (22 months, France), **PhD#1** will study Organic Solvent nanofiltration (OSN) of alkoxy carbonylation in methanol/ethanol.

The polymer membranes will be selected among already identified commercial ones (PDMS & Polyimide), requiring about 300 mL solution for each test (prepared by Chemist **PhD# 4** at University of Rennes ISCR-OMC team with feedback between them).

Then she/he will achieve a systematic study of the selected membrane performances (flux, rejections) in single stage OSN by varying the transmembrane pressure and the concentration in the feed solution.

Results will provide input data for

(1) the transfer mechanism understanding with polymer membranes with cross-feedback of the 5 PhDs of the network dealing with OSN transfer

(2) the simulation of membrane cascades with cross-feedback between the all PhDs of the network dealing with cascades.

Then PhD#1 will systematically simulate OSN cascades up to 5 stages in the retentate/permeate zones as already achieved for other media at ISCR-CIP team.

At VITO (12 months, Belgium) **PhD#1** will acquire experimental data in single OSN with organometallic/ceramic hybrid membranes of VITO and start OSN cascade simulation with these membranes. Comparison of the hybrid/polymer membranes will be done in order to propose the best separation strategy for a full OSN separation on the selected medium, including cascades with the 2 different membranes. Cross-feedbacks with Membranologist **PhD#11** will be useful to compare polymer/hybrid membranes

2 months will be spent at **TIA (France)** to acquire knowledge on membrane pilot design for industrial applications.

Keywords:

Membrane separation, organic solvent nanofiltration, homogeneous catalysis

PhD starting date: 01/11/2023

Application deadline: 31/08/2023 (23:59:00, Paris)

<https://theses.doctorat-bretagneoire.fr/dn-chimsep>

Work location: Rennes, France (two years) & VITO, Belgium (one year)

The Doctoral Candidate will be enrolled in a joint doctorate between two partners of the network. He/she will spend 22 months with the hosting partner (University of Rennes, France) of the present application and then a mobility of 12 months at VITO, Belgium

During the doctoral period, the PhD will also spend 2 months at TIA, Bollène-France working on membrane pilot design for industrial applications.

Contacts

Thesis main supervisor (France)

Murielle Rabiller-Baudry

murielle.rabiller-baudry@univ-rennes.fr

<https://iscr.univ-rennes.fr/>

<https://iscr.univ-rennes.fr/chemistry-and-process-engineering-cip>

Thesis second supervisors (Belgium)

Anita Buekenhoudt

anita.buekenhoudt@vito.be

<https://vito.be/en>

Kriesten de Sitter

kriesten.desitter@vito.be

Required Education Level : Master degree or equivalent

Skills/Qualifications

The candidate will hold a Master degree or equivalent in chemical engineering or in chemistry with competencies in processes and/or membrane processes.

A previous experience in handling membrane processes will be appreciated as well as knowledge in membrane material science.

Knowledge of analytical characterization techniques, in particular UV spectrometry and gas chromatography, will be appreciated

Enthusiasm, autonomy, scientific curiosity and ability to communicate are required qualities.

Required Language: English, level: Good

Required research experience

An internship of several months in a research laboratory involved in membrane separation will be appreciated

Website for additional job details;

See application platform: <https://theses.doctorat-bretagneoire.fr/dn-chimsep> section "Présentation de l'école doctorale » (doctoral network presentation)

Salary

The EU provides support for each recruited researcher in the form of

- Gross salary per month : 2 764 € (net should be around 2 200 €) , an additional annual premium could be paid
- + 600 € of mobility allowance. All eligible researchers recruited within a DN are entitled to receive this allowance. It contributes to the private mobility related expenses of the researcher.
- + 495 € of family allowance per month (if eligible to the conditions: be married or equivalent and/or have a child; family, long-term leave and special needs allowances. The family status of a researcher will be determined at the date of their (first) recruitment in the action and will not evolve during the action lifetime.