



SUPPORTED IONIC LIQUID MEMBRANES FOR APPLICATION TO THE CONTINUOUS SYNTHESIS OF RENEWABLE MOLECULES

This research work focuses on the study of selection of ionic liquids and synthesizing supported ionic liquid membranes (SILM) for the application in the separation of renewable molecules.

Objectives

The research project aims to develop supported ionic liquid membranes (SILM) based technology to investigate the purification of mixed renewable molecules experimentally. The specific objectives are as follows:

- Evaluate experimentally the performance of selected ionic liquid for the separation of target mixtures; These supported ionic liquid membranes aim at increasing notably the permeability and selectivity when compared with dense membranes;
- Feasibility study on the stability of the supported ionic liquid membranes during the process;
- Applicability study on the economic feasibility and environmental impact of the process using supported ionic liquid membrane;

Overall research content

- Screening of Ionic Liquids: In this task, a deep screening of suitable ionic liquids will be carried out. The main decision parameters will be price, viscosity and available data in the literature on selectivity towards organic compounds, in order to develop membranes with further real application;
- Experimental work: Evaluation of the synthesis supported ionic liquid membranes performance (technical viability) in lab-scale. Study the impact of temperature and concentration to the transmembrane flux and purity of the permeates;
- Membrane stability test: The stability studies will be carried out in order to investigate the loss of ionic liquid during the long term process;
- Membrane characterization: SEM-EDX characterization: A scanning electron microscopy (SEM) and energy dispersive X-ray (EDX) analysis will be used to characterize the membrane surface morphology, and the examination of the global chemical composition of the membranes and distribution of the ionic liquid within membrane pores;
- Modelling of mass transfer in the supported ionic liquid membranes;

Qualification requirement

Students with background of environmental/chemical engineering with good laboratory skills.