UCONN | UNIVERSITY OF CONNECTICUT

CONNECTICUT CENTER FOR APPLIED SEPARATIONS TECHNOLOGIES (CCAST)

Pervaporation

Overview:

Many solvents form azeotropic mixtures with water (i.e. water and ethanol at a concentration of 95.6% ethanol). When solvents are used for fuels or industrial processes, the water must be removed. Conventional dewatering techniques, as azeotropic distillation or pressure swing adsorption, are energetically intensive, have a high carbon footprint, and require substantial capital investment.

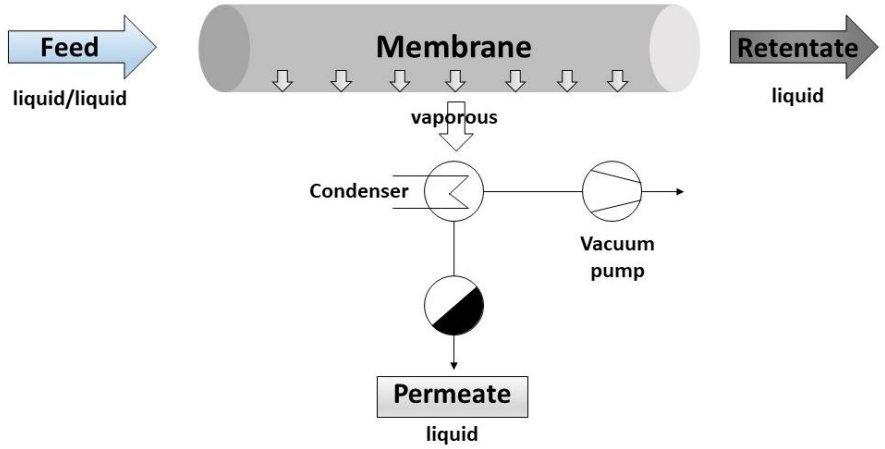
Pervaporation is but one membrane process seen as a pathway toward process intensification of solvent processing. This system enables the testing of different types of membranes across different classes of solvents. Data generated from systems like this will enable better system design and integration with existing industrial processes involving solvents.

Description of the test bed:

- Single channel inorganic **membranes** with a length of 100 mm and 250 mm and outer diameter of 10 mm and inner diameter of 7 mm (adaptable to other membrane geometries, e.g. 4 channel-tubes)
- **Working pressure:** max. 10 bar
- **Working temperature**: Room temperature until 140 °C (depending on feed mixture)
- To be used with **different solvents** and other liquids and their mixtures with water
- Permeating components must have a sufficient high vapor pressure

Services offered:

- Application tests for membrane processes
- Membrane characterization (customer and CEI membranes)
- Development of gas separation processes



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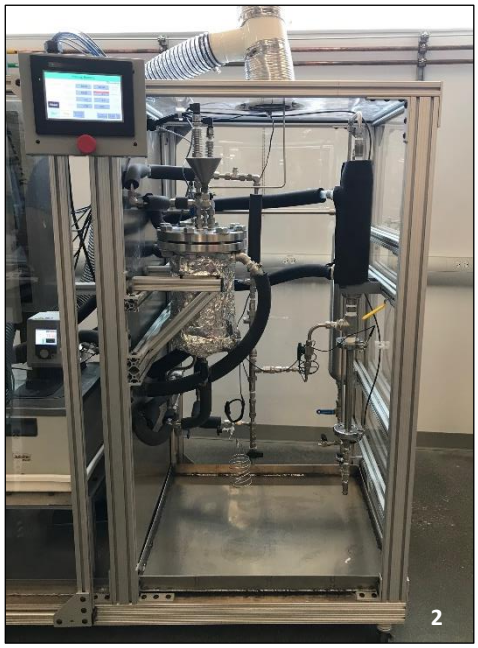

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1 *Separation of a liquid feed mixture (e.g. ethanol/ water) through a membrane in single channel geometry (schematically).*

2 *Pervaporation test rig CEI laboratory which is actually equipped with a module for single channel substrates.*

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