TECH OFFER

Sustainable Solutions For Chemical Separation And Purification

KEY INFORMATION

TECHNOLOGY CATEGORY:
Environment, Clean Air & Water - Biological & Chemical Treatment
Environment, Clean Air & Water - Filter Membrane & Absorption Material
Sustainability - Low Carbon Economy

TECHNOLOGY READINESS LEVEL (TRL): TRL7
COUNTRY: SINGAPORE
ID NUMBER: TO174582

OVERVIEW

The chemical separation industry is highly energy intensive. It accounts for about 15% of world's energy consumption and is one the world's largest silent polluters, producing more than 10% of the annual global greenhouse gas (GHG) emission.

To tackle this challenge, the technology provider has developed solvent-resistant nanofiltration membranes with nanosized pores to achieve chemical separations at a molecular level without the use of heat. By integrating the technology into the chemical separation processes, this technology can reduce their energy consumption and GHG emissions by 90% and lower their operating cost by up to 50%.

The technology provider is seeking industrial partners for collaboration opportunities and would like to work with partners to

identify and solve their pain points in chemical separation processes by utilizing this nanofiltration technology.

TECHNOLOGY FEATURES & SPECIFICATIONS

These nanofiltration membranes are not only solvent-resistant but also thermally stable. They are made up of a modified and cross-linked polymeric material using a facile and environmentally friendly technique, rendering them both stable and scalable. The pore sizes of the developed nanofiltration membranes are less than 1 nm enabling them to be used for highly selective molecular separations. By separating chemicals at the molecular level without heat, this technology is a sustainable alternative to energy-intensive thermal-driven chemical separation processes. Using this sustainable nanofiltration technology can reduce reliance on conventional energy-intensive thermal processes, and significantly reduce GHG emissions and cost. These membranes show high selectivity, high permeance of the solvents, outstanding chemical, and thermal tolerance, as well as exceptional durability for different applications in the vegetable oil, pharmaceuticals, semiconductors, and petrochemical industries.

POTENTIAL APPLICATIONS

Examples of applications include:

- Vegetable Oil: Solvent recovery, Free Fatty Acid (FFA) removal, wax and lipid removal
- Semiconductor: Solvent recovery, Product Upgrading
- Pharmaceutical: Solvent recovery, API concentration and purification, Solvent exchange, Homogeneous catalyst recovery
- Oil refinery and Petrochemical: Hydrocarbon separations, Product upgrading, Monomer removal, Homogeneous catalyst recovery

UNIQUE VALUE PROPOSITION

- Energy-efficient chemical separation with less reliance on thermal processes
- 90% less energy consumption and CO2 emissions
- 50% less operating expenses
- Return on Investment (ROI) in less than 2 years