NUS National University of Singapore | Department of Mechanical Engineering
Faculty of Engineering

You are cordially invited to our:

Department Seminar

Topic: **Gas and Vapor Separation from Air by Liquid membranes - Humidity, CO2, VOC-**

Speaker: **Prof. Akira ITO**
Dept. of Chemical Engineering, Tokyo Institute of Technology

Date: **5 August 2015, Wednesday**

Time: **10.30am to 11.30am**

Venue: **EA-06-05 (Block EA, Level 6)**
(map of NUS can be found at http://map.nus.edu.sg/)

Host: **Asst. Prof. Ernest Chua**

Abstract

Membrane separation has been developed in the field of water purification such as reverse osmosis. The next frontier of the membrane technology is gas and vapor separation. Purification of air is expected to be a new application of membrane separation. In the room or exhaust air, there are many gasses to be separated, such as CO2, humidity (water vapor), VOC (volatile organic compounds). Liquid membrane processes have been proved to be effective for the separation of these gas or vapor in the air by the author. Unlike for polymer membrane, liquid membrane needs special support system under a transmembrane pressure condition. The author has developed an original supported liquid membrane configuration on a hydrophobic microporous membrane. Membrane material could be selected as a suitable liquid for a gas to be separated. Hygroscopic liquid such as glycol can be applied to a dehumidification of air. Amin liquid was applicable to separation of CO2 from air. The separation performances of these membrane processes using a flat membrane module will be shown. "Permeability" is the basic property of a membrane for gas and vapor separation, where the membrane has no pore and uniform material. Usually, this property, permeability, is defined for polymer membranes. In our work, permeability of liquid was evaluated. The permeabilities for ionic liquid and amine liquid were analyzed based on the solution-diffusion mechanism.

About the Speaker

Dr. Akira ITO is a professor in the Department of Chemical Engineering of Tokyo Institute of Technology (Tokyo Tech). He received his B.E. degree, Master degree and Doctor of Engineering in Chemical Engineering from Tokyo Tech. He was a post-doctoral fellow of the Center of Excellence of Membrane Technology in University of Cincinnati for 1982-1983. His research interests include gas and vapor separation by membranes, pervaporation and membrane distillation. Recently, he engaged to develop on the application of liquid membranes with ionic liquids to gas and vapor in the air. Prof. Ito is a recipient of the SCEJ (Society of Chemical Engineering, Japan) Award for Outstanding Research Achievement on 2011 by his works on "Gas and Vapor Separation by Liquid Membranes ." He published more than 70 research papers in Chemical Engineering and Membrane separation, 6 Japanese text books on mass transfer operations, transport phenomena and chemical engineering calculations on Excel.

Admission is free. All are welcome to attend.