Membranes for Water Treatment

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Clean water, clean energy, global warming and affordable healthcare are four major concerns globally resulting from clean water shortages, high fluctuations of oil prices, climate changes and high costs of healthcare. Clean water and public health are also highly related, while clean energy is essential for sustainable prosperity.

Among many potential solutions, advances in membrane technology are one of the most direct, effective and feasible approaches to solve these sophisticated issues. Membrane technology is a fully integrated science and engineering which consists of materials science and engineering, chemistry and chemical engineering, separation and purification phenomena, environmental science and sustainability, statistical mechanics-based molecular simulation, process and product design.

In this presentation, we will introduce our efforts on membrane development for water reuse, seawater desalination and osmotic power generation. In the beginning, we will introduce the basic science of membrane fabrication, then talk about the ultrafiltration membrane development as a pre-treatment for seawater RO. After that, focuses will be shifted to nano-filtration (NF), forward osmosis (FO), membrane distillation (MD), zero liquid discharge desalination (ZLDD) and osmotic power generation. Various material and fabrication strategies to enhance membrane performance will be discussed.

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Biography:

Prof. Chung is a Provost's Chair Professor at the Department of Chemical and Biomolecular Engineering, National University of Singapore. His research focuses on polymeric membranes. In 2005-2008, he worked as a Senior Consultant for Hyflux, led and built its membrane research team. He became a Fellow in the Academy of Engineering Singapore in 2012 and received IChemE (Institute of Chemical Engineers, UK) Underwood Medal for exceptional research in separations and Singapore President's Technology Award in 2015. He was a highly cited researcher in Chemical Engineering & Materials Science and Engineering by the Elsevier and Shanghai Global Ranking in 2016 and received Distinction Award in Water Reuse and Conservation from International Desalination Association (IDA) in 2016. He is also a highly cited researcher in the Highly Cited Researchers list from Clarivate Analytics in 2018. His H-index = 90 (Scopus) or 105 (Google Scholar); Number of citations > 32,285 (Scopus) and > 41,969 (Google Scholar) (Sept 2, 2018).