

Advanced polymer membranes for clean & renewable energy

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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 R&D for clean and renewable energy in terms of hydrogen, natural gas, biofuel and osmotic power generation. In the beginning, we will introduce the importance of this research, then talk about the membrane research for (1) H₂ and CH₄ separation, (2) pervaporation of biofuel and (3) osmotic power generation. Various material and fabrication strategies to enhance membrane performance will be discussed.

Short biography of Prof. (Neal) Tai-Shung Chung

Prof. Chung is a Jade Mountain Chair professor (玉山學者) at the Graduate Institute of Applied Science and Technology of NTUST, Taiwan. Before joining NTUST, he was a Provost's Chair Professor at the ChBE dept of NUS in 2011-2021. His research focuses on polymeric membranes for clean water, clear air, clear energy and pharmaceutical separation. 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 was also a highly cited researcher from Clarivate Analytics in 2018 and 2019. He was ranked as No. 7 in Chemical Engineering worldwide by the list of "the top 2% scientists in the world" published by Stanford University in 2020 (<http://www.globalauthorid.com/WebPortal/EliteOrder.2020>). His H-index =116 (Scopus) or 135 (Google Scholar); Number of citations > 52633 (Scopus) and > 66,847

(Google Scholar) (March 16, 2022). He is an editorial board member of more than 20 journals including J. Membrane Science, Env. Sci. & Tech., AIChE J, Separation & Purification Tech., I&EC Research, Membranes and many others.

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