

# TCSUH SPECIAL SEMINAR

## Sibudjing Kawi

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**Thursday, January 5, 2023**

4:00 p.m. – 5:00 p.m.

**In Person:** Houston Science Center (HSC), Room 102

**Online:** <https://uh-edu-cougarnet.zoom.us/j/98246275851?pwd=ODBtbWhTbY0SEZKYjZBYmthczNUQT09>  
(Zoom ID: 982 4627 5851 and Passcode: 681249)

## Development of Catalytic Hollow Fiber Membranes for Energy and Environmental Applications



**ABSTRACT:** The application of catalytic hollow fiber membrane reactors shows great promise for energy and environmental applications (especially for CO<sub>2</sub> capture and utilization and for hydrogen production, separation, and storage) owing to the high thermal and chemical stability of the ceramic membranes. A catalytic membrane reactor combines reaction and separation in one unit and also synergistically enhances the membrane permeability and catalyst performance (activity, selectivity, stability), resulting in process intensification. The selective removal of one of the products during the reaction often leads to enhance the yield of reaction by shifting the thermodynamic equilibrium according to Le Chatelier's principle. Gas separation membranes represent one of the most significant developments in the inorganic membrane research area,

such as perovskite, zeolite, MOF, Pd/Pd alloy and dual-phase ceramic-carbonate membranes. This lecture will summarize some of the important application and development of oxygen, hydrogen, water, and CO<sub>2</sub>-permeable catalytic hollow fiber membranes in my research group for energy and environmental applications, especially for CO<sub>2</sub> capture and utilization and hydrogen production, separation, and storage (via water gas shift, methane reforming, tar reforming, CO<sub>2</sub> methanation, CO<sub>2</sub> to methanol synthesis, methane pyrolysis, propane dehydrogenation, etc).

**BIO:** Prof. Kawi did his Bachelor, Master, PhD degrees and Postdoc at the Univ. Texas @ Austin, Univ. Illinois @ Urbana-Champaign, Univ. Delaware, and Univ. California @ Davis, respectively, before he joined National University of Singapore. His research focuses on the integration of catalyst with ceramic hollow fiber membranes to tackle energy and environmental challenges (especially CO<sub>2</sub> and H<sub>2</sub> challenges) via valorisation of biomass waste, CO<sub>2</sub>, and natural gas. He has published > 400 papers (citations > 22,500, h index = 79). He is the World's Most Highly Cited Researcher (2021 & 2022, Clarivate). He has served as Associate Editor for 2 journals, Guest Editor for 12 special issues (8 journals), and Editorial Board for 5 journals.

**Host:** Dr. Zhifeng Ren

**Persons with disabilities who require special accommodations to attend this lecture should call 713-743-8212.**