Department of Materials Science and Engineering Seminar Series 2024

Advanced Ceramic Membranes for Water and Separation Applications

Kirk Chin Ho

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Abstract

Ceramics have excellent mechanical, thermal, and chemical properties. They can be functionalized into ceramic membranes by controlling the processing parameters, such as sintering temperature and time to limit excessive densification and grain growth. As a membrane, ceramics retain a portion of these excellent characteristics, which greatly surpasses their polymeric counterparts. However, the multi-step fabrication process of ceramic membranes makes them expensive on an industrial scale. Competitiveness in price and ease of fabrication are two major bottlenecks toward widespread adoption of ceramic membranes today. In this thesis, a methodical and progressive approach was taken to examine and tackle the challenges of the different membrane classifications following three main objectives: fabrication methods, emerging materials, and added functionalities. Beyond the significant reduction in fabrication cost and time, the research achievements also push the boundaries of ceramic membranes, overcoming conventional trade-offs, providing new understanding, and unlocking unique applications in water and separation applications.

Biography

Kirk Chin Ho received his B.Eng. degree from the Department of Materials Science and Engineering at National University of Singapore. He is currently a Ph.D. candidate under the supervision of Prof. John Wang. His research focuses on the fabrication of advanced ceramic membranes for water and separation applications.

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HOST: Prof Ding Jun