Department of Materials Science and Engineering Seminar Series 2024

Chitosan-based Solar Evaporators:

Tailoring Chemistry and Morphology for Sustainable

Solar-driven Water Evaporation and Purification

Patsaya Anukunwithaya

Date and time: 16th January 2025 (Thursday)

3:30PM - 5:00PM

Venue: E7-03-06 - Seminar Room 1

Abstract

The global water crisis has led to a focus on innovative solutions like reverse osmosis (RO), which, while effective, is energy intensive. Solar-driven interfacial evaporation systems offer a sustainable alternative, but challenges related to efficiency, environmental impact, and material costs. This thesis explores the potential of bio-based chitosan in solar evaporators to overcome these limitations. Chitosan is utilized for its hydrophilic properties and design flexibility, making it ideal for improving evaporation efficiency. The study investigates the development of three-dimensional (3D) aerogel structures that leverage additional environmental energy. Tailoring the porous architecture optimizes water transport and self-cleaning capabilities. Additionally, chitosan-based hydrogel films with $-NH_2$ functional groups are explored for their ability to reduce water vaporization enthalpy, and then further boost evaporation rates. By optimizing material composition and structure, these innovations demonstrate the potential of chitosan-based systems to create more efficient and sustainable water purification solutions, advancing solar-driven desalination technologies and freshwater production.

Biography

Patsaya earned her B.Sc. in Chemistry and M.Sc. in Materials Science and Engineering from Mahidol University, where she explored photocatalysis for water treatment. She is currently a Ph.D. candidate under the mentorship of Assoc. Prof. He Chaobin. Her research focuses on developing chitosan-based materials with tailored chemistry and morphology to achieve sustainable solar-driven water evaporation and purification.

Please join us!

Host: Prof Ding Jun