

Faculty Name:

Ngai Yin Yip

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Lab:

Separation Innovations Lab

Project Title:

Development of Li selective membrane technologies

Description:

The development of separation techniques with enhanced selectivity can unlock opportunities for new applications in energy, water, and the environment, such as producing lithium from geothermal brines, purifying rare earth elements for permanent magnets in wind turbines, harvesting uranyl ions from seawater, and removing/recovering nitrogen and phosphorus from wastewaters. This research seeks to demonstrate dual-driving force operation in charge-selective polymeric membranes (termed ion-selective membranes, ISMs) to achieve radically improved and tunable ion-differentiating capabilities. Conventional separation techniques ubiquitously use a single driving force, e.g., temperature-swing adsorption and vacuum filtration (i.e., negative pressure). We hypothesize that the simultaneous utilization of two different driving forces and the thoughtful control of the magnitude and direction of the driving forces can affect the underlying mechanisms governing the separation selectivity. Specifically, we propose to apply a coordinated second driving force of hydraulic pressurization in ISM processes, in addition to the primary driving force of electrostatic potential, to attain unprecedented ion selectivities.

Location of Research:

On Site

of hrs/week:

40

Department/Program:

Earth and Environmental Engineering

Eligibility:

BS, First Year, BS, Second Year, BS, Third Year

To apply, please contact:

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