



Wolfson Department of Chemical Engineering Seminar

Monday, January 29th, 2023 at 14:00

Zoom:

<https://technion.zoom.us/j/95946398059>

Development of Poly(ionic liquids)-based membranes for CO₂ removal

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PhD Mid-Seminar

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Abstract: In recent years, a variety of CO₂ separation technologies have been developed to remove CO₂ from flue gas, natural gas, and syngas. Among them, poly(ionic liquids) (PILs)-based membranes attract increased interest due to their tunability of cation and anion and processability of polymers. In this work, some novel PILs were synthesized to fabricate highly efficient PIL-based membranes. The IL cation of 1-vinyl-3-butylimidazolium was selected as the polymeric backbone to connect cyano- and carboxyl-based side chains to explore their effects. Different PILs-based membranes were prepared by using these synthesized PILs, and their separation performances were tested by gas permeation measurements to identify the best PILs with outstanding properties. Besides, the selected PIL structures were further modified to improve CO₂ separation performance by copolymerizing with polyacrylamide (PAM) and poly(butyl acrylate) (PBA), respectively. Also, to improve gas permeability and selectivity of the PILs-based membranes, the membranes were developed by incorporating amine groups with high CO₂ affinity into PILs. The effect of these functionalized groups on membrane properties were studied, which will lay a foundation for obtaining PIL-based membranes with good performance to provide potential applications for CO₂-related separations.