UCMERCED | CHEMISTRY & BIOCHEMISTRY

DATE 05/02/2025 | TIME 10:30am | LOCATION COB1 110

CHEMISTRY & BIOCHEMISTRY SEMINAR SERIES:

Synthesis and Characterization of Iminopyridines for Reversible Capture of Carbon Dioxide

Abstract:

Decarbonization technologies broadly fall under two catagories: CCS (carbon capture and storage), and CCU (carbon capture and utilization). While industry around CCS is growing, and while many methods of CCU are realized in various homogeneous and heterogeneous catalysis, there lies a great inefficiency in the use of traditional amine capture agents. Amines have long been employed as CO2 capture agents due to their binding specificity for carbon dioxide, and relative stability in mixed gas environments such as atmospheric conditions, or post-combustion flue gas. CO2 binding is a passive process, however, the subsequent decoupling of the CO2 adduct requires a substantial input of energy. This energy penalty hinders the efficiency and scale-up of decarbonization technologies.

Ashton Havens
Graduate Student
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In this work, we explore the synthesis, loading capacity, and reversible binding ability, of novel iminopyridine CO2 capture agents. Density functional methods have been employed to predict the energetic barriers associated with CO2 -adduct dissociation. NMR, IR, and X-ray spectroscopy is used to characterize synthetic products, and measure thermal swings required for capture agent dissociation.

About the Speaker:

A Michigander born and raised, Ashton earned a BSc in Biochemistry from Eastern Michigan University in 2019. He is currently a third-year PhD student studying organic and organometalic chemistry in the lab of Dr. Michael Findlater.

For more info, contact:Michael Findlater michaelfindlater@ucmerced.edu.