

Materials Chemistry Seminar

Friday, February 16, 2024
11:30 a.m. ~ BRWN 4102

"Employing Biomimetic Chemistry for Novel Adhesive Systems: Tapes and Anti-Corrosive Coatings"



Richard Godsel

Graduate Student, Purdue University

Abstract:

The global expenses related to damage repair on structures and vehicles in wet environments are in the hundreds of billions of dollars annually. The development of high-performance adhesives and coatings will assist in the mitigation of these costs while ensuring that repairs, both permanent and temporary, are more effective.

In the Wilker Lab, we are currently working on two new underwater adhesive systems to compete with products already available on the market: a pressure sensitive adhesive (PSA) for tapes and an organic coating to prevent corrosion. For the PSAs, we have added catechol to both commercial and lab-synthesized polyacrylates, and we have shown via materials testing that this improves adhesion to aluminum substrates under artificial sea water. For the coatings, we have produced a multitude of formulations containing poly(vinylcatechol-styrene) (PCS) by varying solvents, plasticizers, fillers, and solids content, as well as application method. Coating bare carbon steel surfaces with our optimal formulations prevents rust from forming even after extended periods submerged under artificial sea water. Corrosion prevention is quantified through electrochemical methods.

Bio:

Richard Godsel is a second-year graduate student. He received his B.A. in Chemistry from Northwestern University. While there, he worked in the lab of Professor Mercuri Kanatzidis researching ion exchanging layered metal chalcogenides for water remediation and nuclear waste treatment. Upon becoming a student at Purdue University in 2022, Richard joined the Wilker Lab where he now researches the development of new systems for underwater adhesion.