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INDUSTRIAL SEMINAR SERIES

CHEMISTRY SEMINAR

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RockyTech, Ltd.

Leveraging Dynamic Covalent Chemistries to Develop a Scalable Approach for Polymer Circularity

Plastic materials are ubiquitous in contemporary society, with applications in virtually every industry due to their durability and versatility. Unfortunately, these characteristics, coupled with large-scale production and often irresponsible disposal methods, have led to significant and concerning levels of environmental pollution. To combat these issues, RockyTech has developed technologies that utilize dynamic covalent chemistries to foster a more sustainable and responsible approach to plastic production and usage. When incorporated into polymers, these chemistries give rise to covalent adaptable networks (CANs), a breakthrough material class that bridges the gap between traditional thermosets and thermoplastics. CAN materials retain the mechanical strength and dimensional stability of thermosets while also offering the recyclability and processability characteristic of thermoplastics. This unique functionality stems from their dynamic covalent bonds, which undergo reversible exchange under external stimuli, which allow these networks to be reshaped, repaired, or recycled without compromising performance. In this talk, I will highlight RockyTech's efforts to develop CAN-based (1) chemical additives for the upcycling of polyolefin waste, (2) recyclable thermosets and composites, and (3) technologies that improve the reprocessability of industrially relevant proton exchange membranes (e.g., Nafion™), thereby advancing the plastics industry toward a circular economy.

About the Speaker

Dr. Louis Corcoran obtained his B.S. in Chemistry and Mathematics from Northland College and his Ph.D. in chemistry from the University of Minnesota Twin – Cities (UMN). He began his professional career at RockyTech Ltd in the fall of 2023 where he and his colleagues have developed technologies that utilize novel reversible covalent chemistries to improve the sustainability of traditional polymeric materials. In his role as a Senior Research Scientist, Dr. Corcoran leads R&D efforts for various RockyTech projects, writes grant proposals as a Primary Investigator, and has presented RockyTech's technologies at three international research conferences. Throughout his professional and academic career his research interests have been at the interface of sustainable material design and materials characterization.