

O-I-M Seminar Series

Organic/Inorganic/Materials • <https://chemistry.uoregon.edu/>

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May 26, 2023 • 3:00 pm, WIL 110

Hosted by Ramesh Jasti

“Merging Organic Synthesis & Macromolecular Chemistry to Design Efficient Catalysis & Diverse Polymers”

Efforts to develop synthetic methods that achieve robust materials (e.g., sequenced organic electronics, polymerizable renewable feedstocks, and/or sustainable cooperative catalysis) have generated a need to engineer strategies that merge organic synthesis and polymer chemistry to address grand challenges. Our group's research is inspired by Nature and founded on using polymer chemistry to address shortcomings in organic synthesis, and using organic chemistry to confront challenges in polymer synthesis. This talk will detail our group's recent efforts at this interdisciplinary interface. We will first discuss our homogeneous polymer catalysts that are visible-light activated and feature significant rate acceleration in cooperative organic photoredox catalysis, ascribed to more efficient single-electron transfer. Our approach deviates from conventional methods, and tackles diffusion-limited cooperative catalysis, while enabling enhanced reactivity under polymer confinement. Second, we will disclose the synthesis of sp^3 -hybridized 1D carbon-based polymers from simple petroleum-based or biomass-derived sp^2 feedstocks under pressure. In these studies, we have uncovered new robust materials from abundant aromatics (e.g., furan, phenol, pentafluorophenol) that are theorized to possess high tensile strength and chemical versatility.

