

## **Development and Applications of New Synthetic Strategies for Polymer Science**

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Synthetic polymers are of significant importance in all aspects of modern life, and during the last few decades, these materials have facilitated major societal advances. Innovative polymeric materials have the potential to address humankind's next grand scientific and technological challenges; however, taking advantage of the opportunities presented by these materials requires new methods for gaining precise control of polymer structure and function. To address this challenge, our research group focuses on the development of new synthetic methods and catalyst systems to control polymer architecture, composition, and function to yield next-generation materials. This presentation will detail the development of methods that enable switching of polymerization mechanism and monomer selectivity using external stimuli to control polymer structure and function. Additionally, recent discoveries in our group on controlled cationic polymerizations that can be run open to the air without monomer purification will be discussed. These new methods enable the streamlined synthesis of polymeric materials with precisely controlled structures.