



Frank Leibfarth

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Frank Leibfarth is the Royce Murray term Distinguished Professor at the University of North Carolina at Chapel Hill. He attended the University of South Dakota, where he was a Goldwater Scholar and graduated summa cum laude in 2008 with degrees in Chemistry and Physics. He conducted his Ph.D. in chemistry at the University of California Santa Barbara under the direction of Professor Craig J. Hawker studying polymer functionalization. In 2013, Frank began his postdoctoral studies at MIT under Professor Timothy F. Jamison as an NSF Fellow. He began his independent career in 2016 at UNC Chapel Hill.

The overarching goal of the Leibfarth to develop synthetic methods that transform readily available starting materials into functional and sustainable thermoplastics with molecular-level precision. To accomplish these goals, his group leverages polymer chemistry, organic chemistry, and continuous flow chemistry to provide solutions to challenges in sustainable plastics and water purification. The work of Professor Leibfarth's group has been recognized by the Blavatnik Laureate Award in Chemistry, the Popular Science Brilliant Ten recognition, the Presidential Early Career Award in Science & Engineering, and the Sloan Research Fellowship, among others. At UNC, Prof. Leibfarth has been recognized by the Tanner Award for Excellence in Undergraduate Teaching and as the Winter 2021 commencement speaker.

Abstract: "Different Approaches to Generate Stereodefined Polymers"

The stereochemistry of polymers, known as polymer tacticity, is intimately linked to their resultant material properties. Despite the well-developed stereoselective methods for the polymerization of propylene and other nonpolar α -olefins, general approaches to the stereodefined polymers are less developed. In this lecture, I will discuss how our group uses principles of modern asymmetric catalysis to control the stereochemistry for a variety of polymers where stereocontrolled variants were previously challenging to access. We take three approaches to this challenge: 1) We have advanced asymmetric ion pairing catalysis as a general approach for the stereoselective polymerization of prochiral monomers, where high levels of kinetic stereocontrol are achieved during each monomer enchainment step; 2) Stereoconvergent polymerization of chiral, racemic building blocks, where the chirality of the ligand on a transition metal catalyst controls regio- and enantioselectivity; 3) Stereoediting of atactic polymers, where the tacticity of polymers is changed post-polymerization without a depolymerization or repolymerization step.