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Marc Hillmyer received his B.S. degree in Chemistry from the University of Florida in 1989. He worked as an undergraduate research assistant in the laboratory of Professor Kenneth Wagener on the development of Acyclic Diene Metathesis Polymerization. He then attended the California Institute of Technology and was a graduate assistant in Professor Robert Grubbs' research group. His research focus at Caltech was on the preparation of functionalized polymers by Ring-Opening Metathesis Polymerization using newly developed ruthenium metathesis catalysts. Upon earning a Ph.D. in Chemistry from Caltech

in 1994, Marc moved to the Department of Chemical Engineering and Materials Science at the University of Minnesota as a postdoctoral research associate in the group of Professor Frank Bates. With Professor Bates, Marc worked on research projects emphasizing the synthesis and self-assembly of block copolymers. In 1997 Marc joined the Chemistry Department at the University of Minnesota where he is currently the McKnight Presidential Endowed Chair in Chemistry, Distinguished University Teaching Professor, and Distinguished McKnight University Professor. Principal efforts in his group focus on research at the intersection of sustainability and polymer science. Since starting in Chemistry at Minnesota, Marc has received several awards and honors including the Camille Dreyfus Teacher-Scholar Award, the Packard Fellowship for Science and Engineering, the Carl S. Marvel Creative Polymer Chemistry Award, the PTN Medema Award, European Polymer Federation EPF Prize, and he is a Fellow of American Association for the Advancement of Science, the American Chemical Society, the ACS Division of Polymer Chemistry. He was also elected to the American Academy of Arts and Sciences. In addition to his teaching and research responsibilities, Marc served as an associate editor for the ACS journal *Macromolecules* from 2008–2017 and is currently the editor-in-chief of *Macromolecules*. He is also the director of the Center for Sustainable Polymers headquartered at the University of Minnesota.

Abstract: “Telechelic Polymers for Sustainable Polyolefins”

Polyolefins are ubiquitous. They are lightweight, strong, and stable. These features render them useful in countless applications. Unfortunately, these attributes also contribute to the accumulation of persistent plastic waste in the environment. While polyolefins can be mechanically recycled, often this results in an inferior product and is in part the reason that only a small percentage of polyolefin products are effectively recycled. We have embarked on an effort to prepare polyolefins with functional groups at their chain ends. These telechelic polyolefins can be stitched together to form high molar mass plastics and thermosets. By virtue of the synthetic pathway used to make these materials, we generate products that include weak links along the backbones of the polymer chains. These links can be chemically cleaved to quantitatively deconstruct the material and allow for efficient chemical recycling back to the starting telechelic polymers that can be subsequently repolymerized. Our approach takes advantage of a tandem catalysis strategy that is perfectly atom economic and readily scalable. In this lecture I will discuss the preparation of the telechelic polyolefins and their use in the preparation of degradable polyolefin-based plastics and thermosets. I will also report on their materials properties, scalability, and recyclability.