



Brett P. Fors

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Brett P. Fors was born in Montana and carried out his undergraduate studies in chemistry at Montana State University (2006). He went on to do his Ph.D. (2011) at the Massachusetts Institute of Technology with Professor Stephen L. Buchwald. After his doctoral studies, he became an Elings Fellow at the University of California, Santa Barbara working with Professor Craig J. Hawker. In of 2014 he joined the faculty at Cornell University and is currently the Frank and Robert Laughlin Professor in the Department of Chemistry and Chemical Biology. His group's research focuses on the development and application of

new synthetic methods for polymer science.

Abstract: "Sustainable Thermosets from Dihydrofuran"

Thermosets are robust materials due to their cross-linked structures, but these same cross-links make them difficult to recycle or degrade, posing a significant sustainability challenge. Existing strategies for bio-derived or degradable thermosets often require multi-step, resource-intensive syntheses and remain impractical as alternatives to conventional materials. In this presentation, we report a modular, one-pot approach to degradable and recyclable thermosets using the commercially available, bio-sourced monomer 2,3-dihydrofuran (DHF). In the presence of a ruthenium catalyst and a photoacid generator, DHF undergoes slow ring-opening metathesis polymerization to form a soft polymer. Subsequent light exposure triggers acid generation, initiating cationic polymerization of the same DHF monomer to create spatially controlled cross-links, strengthening the material. By tuning catalyst loading and light exposure, we can access a wide range of mechanical properties and spatially resolved material domains. Importantly, these DHF-based thermosets undergo stimuli-selective degradation and can be depolymerized back to monomer under mild heating. By leveraging two distinct polymerization mechanisms on a single functional group, this strategy provides precise control over thermoset properties while enabling recyclability, representing a significant advance toward sustainable, high-performance materials.