

**“From Trash to Treasure: Advancing  
the Heterogeneous Catalytic  
Deconstruction and Upcycling of  
Waste Polyolefins”**

**Wednesday  
February 2, 2022  
3:30 pm  
Wu & Chen Auditorium**



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**Abstract**

The rapid global consumption of single-use plastics has caused an unsustainable accumulation of plastic waste in landfills and the environment. Unfortunately, current mechanical recycling methods are expensive and produce lower-quality products. New strategies in targeted chemical upcycling of waste plastics offer unique opportunities for selective depolymerization of polyolefins to higher value chemicals under milder conditions than thermal deconstruction or pyrolysis. Inspired by recent developments in the depolymerization of lignin, we turned to the method of hydrogenolysis to break the strong C-C bonds in polyolefins. This talk will cover our efforts in identifying a class of ruthenium-based materials as active and selective heterogeneous catalysts for the depolymerization of polyolefin waste, catalyst support modification strategies to further improve selectivity towards processible liquid alkanes, and new frameworks for the chemical upcycling of waste plastics and complex mixed waste streams to enable a circular carbon economy.

**Bio**

Dr. Julie Rorrer is an Arnold O. Beckman Postdoctoral Fellow at the Massachusetts Institute of Technology. She received her B.S. in Chemical Engineering from Arizona State University in 2014, and her Ph.D. in Chemical Engineering from the University of California, Berkeley in 2019. Her research interests are centered on enabling sustainable chemical transformations using heterogeneous catalysis. She is also a fellow of the MIT Communication Lab and the founder of the ongoing outreach initiative ColorMePhD.

**CBE Faculty Candidate**

