



Julie Rorrer, Ph.D.

Assistant Professor

University of Washington – Seattle

Department of Chemical Engineering



Overcoming Barriers in Waste Plastic Conversion Using Heterogeneous Catalysts

Abstract

The global generation and consumption of single-use plastics is massive since the various polymers in plastics provide effective packaging and materials for food, medicine, consumer products, and more. Unfortunately, this rapid consumption has caused an unsustainable accumulation of plastic waste in landfills and the environment, causing harm to the ecosystem and human health. Polyolefins including polyethylene and polypropylene are among the most common single-use plastics. Mechanical recycling can prolong the lifetime of these materials in the economy; however, the material quality cannot yet compete with virgin polymers. Chemical recycling with heterogeneous catalysis offers an opportunity to selectively deconstruct polyolefins into higher value chemicals and monomers. Emerging methods include hydrogenolysis, hydrocracking, metathesis, and other solvent-assisted depolymerization reactions. The scalability of these methods is limited by barriers including the high cost of reactants, requirement for molecular hydrogen or solvents, and expensive catalysts. This talk will first discuss advances in the catalytic depolymerization of waste plastics with a focus on thermal catalytic deconstruction of polyolefins under mild conditions. This will be followed by a discussion on emerging frameworks for the chemical recycling of mixed plastic waste feedstocks and an outlook on remaining technical challenges as well as economic and environmental considerations in polymer upcycling, re-design, and circularity. The last part of the talk will shift gears and discuss the Rorrer lab's ongoing efforts in promoting community engagement in science and engineering and our research in fostering equitable and inclusive research environments.

Biography


Dr. Julie Rorrer is an Assistant Professor in the Department of Chemical Engineering at the University of Washington– Seattle. The Rorrer lab's research is centered on the conversion of sustainable and renewable feedstocks into valuable chemicals using heterogeneous catalysis. Julie received her PhD in Chemical Engineering from the University of California, Berkeley in 2019 and her BS in Chemical Engineering from Arizona State University in 2014. Prior to the University of Washington, Julie was an Arnold O. Beckman postdoctoral fellow at the Massachusetts Institute of Technology. In addition to fundamental research in sustainable catalysis, Julie is also the founder of the ongoing community engagement program, ColorMePhD, which creates coloring pages to explain current research in science and engineering to a non-technical audience and highlight role models for aspiring scientists.

Women in Sustainability Coffee Hour

Join us for an informal coffee hour for women in sustainability and their allies at 9AM before the seminar to meet with our speaker and connect with others involved with and interested in sustainability.

Please register your interest using the QR code on the bottom left of this flyer—further details to follow closer to the time.

 **November 10**

 **11:00 AM**

 **CLB 366**



Register to
watch live on
Zoom



Coffee Hour