



THE OHIO STATE UNIVERSITY

The William G. Lowrie Department of Chemical and Biomolecular
Engineering Graduate Program Cordially invites you to attend a seminar on
**Microwave-Assisted Technology Enables Valorization of Plastic
and End-of-Life Tire Waste**

Dr. Sean Najmi

Postdoctoral Researcher

University of Delaware

January 23, 2024, 11:30 AM

130 Koffolt Lab, CBEC 151 W Woodruff Ave

Reception at 11:00 AM - CBEC Lobby

Bio

Sean Najmi obtained his BS in chemical engineering from the University of Maryland, Baltimore County (UMBC) where he was a Meyerhoff Scholar and MARC U*Star Trainee. He then went to Georgia Tech for his PhD where he worked under Carsten Sievers and AJ Medford. Currently, Sean is a postdoctoral researcher at the University of Delaware in the lab of Dionisios G. Vlachos working in the Center for Plastics Innovation. He has been awarded the NSF Graduate Research Fellowship, DOE Graduate Student Research Program award, and multiple conference travel grants. Sean's research interest lies in developing sustainable energy technologies to decarbonize chemical manufacturing through catalysis, polymer circularity and process intensification.

Abstract

Commodities like plastic and rubber are completely hydrocarbon-based, as are the fuels supplying energy for the entire chemical manufacturing sector. Additionally, the accumulation of plastic and waste tires has caused harm to the environment and society. Chemical recycling can enable closed-loop recycling and circularity while valorizing plastic and tire waste as feedstock for other products to combat these waste challenges. Decarbonizing our energy sector will reduce fossil fuel reliance and can be accomplished through electrified sources such as microwave-assisted heating. Here, I detail the application of microwave-assisted heating for the chemical recycling of polyethylene terephthalate (PET) and pyrolysis of end-of-life (EOL) tires. The mechanism for PET depolymerization is investigated, and applications of products that form are briefly discussed. Next, I show how microwave-assisted solvent extraction removes the harmful additives commonly found in EOL tires. New strategies to upcycle these additives via catalysis are presented. Finally, the deconstruction of EOL tires to value-added aromatic products using microwave-assisted pyrolysis is shown and further discussed.