

# *Polyolefin innovations for a decarbonized society*

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**Chemistry  
Seminar on  
*Polyolefin and its  
carbonization***

**Monday  
Sept 25 at 4  
pm in 303  
Schrenk**

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**Abstract:** Development of circular economy necessitates sustainable technologies for materials production with global optimization of energy, carbon footprint, and cost. This talk will discuss the robust and versatile use of polyolefin materials and their waste toward future carbon manufacturing, unlocking their untapped potential for a decarbonized society. First part will focus on converting commodity polyolefin waste to environmental sorbents, with an example application of carbon capture. This will be followed by demonstrating two innovative and robust uses of polyolefin materials, including additive manufacturing of carbons and fabrication of ordered mesoporous materials. We will discuss how to enable precise manufacturing of their large-scale, complex carbon structures with controlled mechanical performance and functionality for Joule heating application. Additionally, we will share our recent progress in converting nanostructured polyolefins, such as commodity thermoplastic elastomers, to functional porous materials. The underlying mechanism of structural evolution during crosslinking and carbonization will be elucidated. Collectively, these works show the unparalleled potential of polyolefin material as a platform material for manufacturing functional carbons, as an integrated effort toward developing a sustainable future.

**About the speaker:** Dr. Zhe Qiang is an Assistant Professor of Polymer Science and Engineering at the University of Southern Mississippi (USM). He received his M.S. and Ph.D. degrees in Polymer Engineering from the University of Akron, and was a postdoc fellow at Northwestern University. His group's current research interests include materials and manufacturing science of polymers and their derived functional materials for the sustainable development of environment and society, including industrial decarbonization and waste recycling. Since the start of his independent career in 2019, Dr. Qiang has received many awards and honors, including ACS PRF Doctoral New Investigator Award (2021), NSF EPSCoR Research Fellow (2022), *Forbes* 30 under 30 in Science (2022), USM College of Arts and Science Junior Faculty of the Year (2022), ACS PMSE Early Career Investigator (2023), SAMPE Emerging Leadership Award and the Young Professional of the Year (2023), USM Basic Research Award (2023), NSF CAREER Award (2023), and AIChE 35 under 35 (2023).