Reika Katsumata

Assistant Professor of Polymer Science and Engineering
University of Massachusetts Amherst

Wednesday, June 11th

10:30am - 11:30am

Steele 006

"Intermediate Polymer Dynamics — What They Are, Why They Matter"

Abstract: Different length and time scales of polymer dynamics are manifested in everyday life as thermophysical properties, such as viscosity and glass transition temperature. Recently, we observed a hidden low-frequency relaxation typically masked by the DC conductivity signal in dielectric spectroscopy. This newly identified relaxation process, termed the "slower" process, occurs at a rate slower than well-known α-relaxation. We further demonstrated that the slower process could explain anomalous rheological properties of nanocomposite loaded with ultra-small nanoparticle, polyhedral oligomeric silsesquioxane (POSS). In this talk, I will discuss the potential explanation for the molecular-level mechanism of the slower process, its relation to slow Arrhenius process (SAP), and recent experimental investigations.

Biography: Reika Katsumata is an assistant professor in the Polymer Science and Engineering Department at UMass Amherst, who received a B.E. in Organic and Polymeric Materials from the Tokyo Institute of Technology (Institute of Science Tokyo) and a Ph.D. in Chemical Engineering from the University of Texas at Austin. Leading the Katsumata Research Group at the intersection of chemical engineering and materials science, she focuses on revealing material performance that is otherwise impossible by designing extremely confined soft/hard interfaces. Her three main research thrusts involve leveraging rapid thermal annealing for functional porous materials and defect-healing/doping 2D materials, developing reprocessible crosslinked polymers through ultrasound-mediated bond-exchange reactions for sustainability, and laying the foundation by understanding polymer dynamics and wettability at interfaces.

Honors and Awards:

- ACS Polymers Au: Rising Stars in Polymers
- American Chemical Society, Division of Polymeric Materials: Science and Engineering (ACS PMSE): PMSE Early Stage Investigator Award
- Air Force Office of Scientific Research (AFOSR): Young Investigator Research Program (YIP)
- Japan Science and Technology Agency (JST): PRESTO Award
- 3M: Non-Tenure Faculty Award
- National Science Foundation: Faculty Early Career Development Program (NSF CAREER)
- American Chemical Society, Petroleum Research Fund (ACS-PRF): Doctoral New Investigator (DNI) Grant