FALL 2021 CHEMISTRY SEMINAR SERIES

DR. ANDREW MAGENAU

Department of Materials Science and Engineering

Drexel University
Philadelphia, PA

HOST: DR. JAEKLE

ALL THOSE INTERESTED ARE WELCOME TO ATTEND

RUTGERS
UNIVERSITY | NEWARK

Department of Chemistry
73 Warren Street, Olson Hall
Newark, New Jersey
https://sasn.rutgers.edu/chemistry

"Synthesizing Materials using New Pathways: From Triggered Block Copolymer Self-assembly to 2D Hybrid Nanocomposites"

Friday, October 29, 2021, 11:30 AM
Life Science Center II, Room 130

Abstract: Simple and versatile synthetic strategies that enable the design of complex polymeric architectures are a central element to developing new, advanced, soft materials. Three such approaches to macromolecular materials will be discussed including triggered self-assembly via chemical fuels, robust reversible deactivation radical polymerizations via oxygen consumption, and scalable nanocomposites via filler modification and chemical initiators. As a first approach, FISA (functionalization induced self-assembly) is discussed as a unique strategy for the in-situ self-assembly of block copolymers through two highly efficient reactions. Key aspects and parameters of FISA are explored to understand this dynamic process and to establish critical synthesis-structure-property relationships. As a second approach, AI-RAFT (alkylborane initiated reversible addition-fragmentation chain transfer) is discussed as a novel initiation platform for synthesizing well-defined polymers at room-temperature while in the presence of oxygen. Fundamental relationships are explored using a range of alkylborane Lewis acid-base pairs, chemical deblockers, and reaction conditions toward establishing optimal polymerizations. As a last approach, new strategies are discussed for the synthesis of nanocomposites with CNTs and MXenes to improve loading thresholds, dimensional restrictions, and filler dispersibility.

Biographical sketch: Andrew Magenau is an assistant professor at Drexel University who joined the faculty of the Materials Science & Engineering Department in 2015. He received his Bachelors in Plastics Engineering from the Pennsylvania State University and PhD in Polymer Science & Engineering from the University of Southern Mississippi under Professor Robson Storey focused on functionalizing polymers using click chemistry and synthesizing block copolymers by combining controlled/living polymerizations. Afterward, he joined Krzysztof Matyjaszewski at Carnegie Mellon University as a visiting assistant professor where he focused on atom transfer radical polymerization and electrochemistry. Following his academic training, he joined the NIH's Molecular Biosensors & Imaging Center developing genetically targetable fluorescent probes for live-cell imaging and later worked in central research & development at DuPont. His current research interests are centered on the development of new synthetic platforms to advanced polymeric materials with applications in composites, rapid manufacturing adhesives, nanoparticle capture and protection, and bioimaging.