

Department of Chemistry and Biomolecular Science  
Clarkson University  
**Seminar**

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**Professor Junpeng Wang**

School of Polymer Science and Polymer Engineering  
The University of Akron

*will speak on*

**Rational Design of Next-Generation Sustainable Polymers**

**Abstract:**

Synthetic polymers such as plastics, nylon, and synthetic rubber have been used in nearly every aspect of modern life; the dominant use of these polymeric materials is driven by their durability and versatile thermomechanical properties. However, the excellent thermal and chemical stability of commercial polymers makes them challenging to recycle and reuse. Currently, over 300 million tons of plastics are produced each year and 95% of them are not recycled. Consequently, most polymer products are consigned to landfills or thrown into the ocean, causing serious environmental concerns. Moreover, the production of polymers consumes finite fossil resources such as petroleum and coals, and the inability to recycle these materials causes concerns regarding the sustainability of their use. Sustainable polymers have received considerable attention as an option for sustainable materials. Despite the developments, few chemically recyclable polymers can match the stability and mechanical properties of the polymeric materials in current use. This presentation will cover our recent effort in overcoming these challenges, including two aspects of works. First, we developed a new class of degradable polymers that go through a two-step degradation mechanism—mechanochemical activation followed by degradation; the controlled degradation has been shown to significantly improve the stability of materials. The second work is on a new class of depolymerizable polymers from fused-ring cyclooctenes; the fused-ring system lowers the ring strain energies of the monomers and allows the corresponding polymers to depolymerize into the monomers.

**Friday, November 12, 2021**  
**3:30 pm**  
**212 Bertrand H. Snell Hall**

[Zoom Information](#)