ND EPSCoR - Center for Sustainable Materials Science
Novel Thermally Degradable Polymers

Qianli Rick Chu, Associate Professor
Chemistry, University of North Dakota

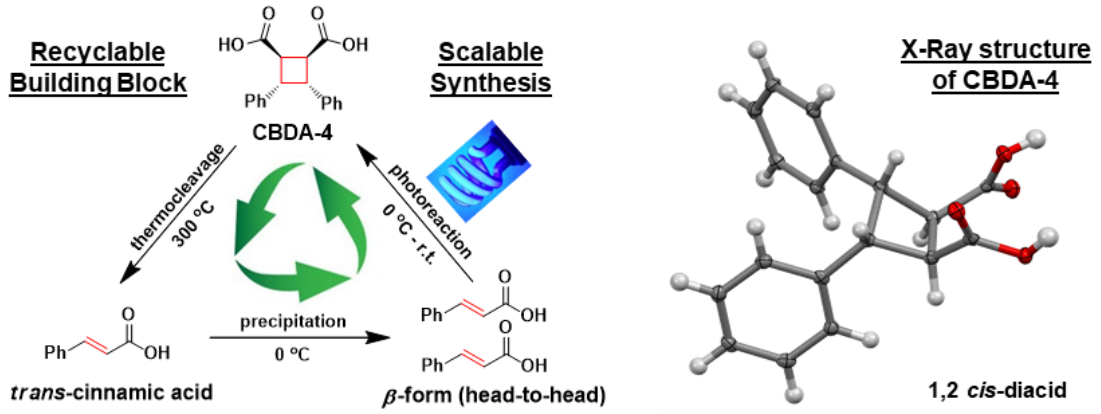
Award Title:	INSPIRE-ND
NSF Award Number:	OIA-1355466
Principal Investigator:	Kelly A. Rusch, Ph.D., P.E., BCEE
Lead Institution Name:	North Dakota State University
Award Start Date:	8/1/2014
Award End Date:	1/31/2020
Highlight Submission Date:	5/1/2019

What is the outcome or accomplishment?

Plastic waste is recognized as an increasingly negative environmental impact. CSMS researcher Qianli Chu and co-workers have synthesized novel diacids using a photoreaction, an eco-friendly method, to degrade the diacids at the end of their functional lives. The diacid polymer building blocks are cleaved back to its monomers, using heat.

What is the impact?

The discovery of thermal cleavability of CBDA-4 will open new avenues for making thermally recyclable and/or degradable materials, such as sustainable polymers.



What explanation/background does the lay reader need to understand the significance of this outcome?

Polymeric materials are used every day. However, there is a growing negative impact on the

ecosystem with the accumulation of non-degradable plastics in the ocean and landfills. Novel methods to degrade polymers after their lifetime will be important for the future health of the planet. The researchers have found an environmentally friendly means of using heat or deep UV to degrade the diacid building blocks, creating new possibilities for making thermally recyclable and/or degradable materials, such as sustainable polymers. Thanks to NSF's funding of this project through ND EPSCoR, the Innovative and Strategic Program Initiatives for Research and Education-North Dakota (INSPIRE North Dakota) has facilitated fundamental research that has the potential to solve a significant global problem.