Summary for Public Release

Applicant: IBM Almaden Research Center
Principal Investigator: Dr. Robert D. Allen
Project Title: Upcycling PET via the VolCat process

Project Objectives: Building on pioneering R&D by IBM Research, this project aims to optimize key unit processes, scale-up, and demonstrate an integrated process for a novel organocatalytic waste PET chemical recycling method known as VolCat. Both waste flake from bottles and polyester textile waste will be inputs to this chemical recycling process. The rPET output derived from this scaled, optimized process will be used to demonstrate bottle-to-bottle recycling, fabric-to-fabric recycling and upcyling to higher value polymers. Finally, the process economics will be determined.

Project Description: VolCat unit operations (e.g., catalytic depolymerization, product purification and isolation) will be explored, optimized, and scaled for two broad categories of waste PET inputs, flake from post-consumer bottles and polyester textiles. The process economics will be assessed through TEA and LCA. Finally, recycling and upcycling demonstrations will be performed and assessed for three challenges starting with waste PET: fabrication of new bottles, new garments and new high value plastics.

Project Impact: Innovation is required in solving the plastic waste problem. Demonstration of a scalable, economical recycling process capable of processing low quality waste polyester flake and textile to produce polymerization-quality monomer for the creation of new PET and other higher value polymers (e.g., PBT) would be a game changer. We feel that with the dream team assembled with a focus on the promising VolCat technology, we can solve this significant challenge.

Major Participants: IBM Research, NREL, Unifi Manufacturing, Under Armour, Milliken & Company, Husky, University of Oklahoma and Niagara Beverages