

Developing Peptoid Catalysts for Ester Hydrolysis Towards PET Degradation

Galia Maayan & Sabrina Spatari

The global impact of plastic pollution today threatens ecosystems and human health worldwide. Mitigating this impact by means of a “circular” economy requires investment in breakthrough technologies that can create economically valuable commodities from plastic waste. Chemical recycling of plastic under near-ambient conditions could produce valuable platform chemicals to use as feedstock for new commodities. Here, we investigate the production and use of a novel biomimetic catalyst and evaluate its role in decomposing PET, a bulk-produced commodity plastic that is collected in municipalities worldwide. Through experimental investigation and molecular dynamics modeling, this proposed research will optimize the operation of the catalyst in decomposing PET to a valuable chemical intermediate and derive a first estimate of the energy and greenhouse gas emissions related to chemically recycling PET at low temperatures. The project aligns with the goals of the Resnick Sustainability Center for Catalysis of advancing promising catalyst-driven technologies to meet U.N. Sustainable Development Goals for transition to a sustainable economy.