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Enabling Polyolefin Circularity Through Upcycling and Compatibilization of Plastic Waste

ABSTRACT

Polyolefins represent the largest contribution to plastic production, use, and generated waste worldwide (e.g., 62% of plastics produced in the U.S. are polyethylenes and polypropylenes), yet their recycling rates are abysmally low (1-10% for various polyolefins in the U.S.). More efficient methods of recycling polyolefins have been underexplored, due to significant technological, scientific and economic challenges. Current recycling is limited by the inherent cost in and supply chain logistics of collecting, sorting and cleaning diverse plastic composition waste streams, the presence of additives, fillers and inks, and the downgrading of polymer properties during mechanical recycling. The lack of control over polymer architecture and molecular weight invariably results in recycled materials with inferior properties.

This presentation will discuss new strategies for recycling and reuse of polyolefin waste, including (i) upcycling polyolefins to durable thermoset materials and (ii) compatibilizing mixed plastic waste. Challenges which are unique to polyolefin recycling and the opportunities they present for polymer scientists will also be discussed.

BIOGRAPHY

Dr. Megan Robertson is a Cullen College of Engineering Professor in the William A. Brookshire Department of Chemical and Biomolecular Engineering at the University of Houston, where she is a leading researcher in the field of polymer sustainability. She is the project director for the recently awarded Welch Foundation Catalyst for Discovery Center for Plastic Circularity. Prior to her tenure at UH, Dr. Robertson earned her PhD at the University of California, Berkeley, where her research focused on the design of polymer compatibilizers. Dr. Robertson also conducted post-doctoral research at the University of Minnesota. She is a Fellow of the American Chemical Society and has served in leadership for the ACS Polymeric Materials: Science and Engineering Division. Currently, Dr. Robertson serves as an Associate Editor for the journal *Macromolecules*.



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