Combining Polyethylene and Isotactic Polypropylene

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Polyethylene and polypropylene are the two most abundant plastics accounting for nearly two-thirds of annual polymer production. Mechanical recycling of these materials typically results in a brittle blend with poor mechanical properties as a result of cross-contamination, phase separation, and poor interfacial adhesion. This work will discuss the synthesis of novel multiblock copolymers and their ability to compatibilize virgin and recycled PE and iPP into tough mechanically robust blends. Future targets and approaches to expanding this paradigm will be presented as part of the new Eagan group’s research interests.

Biography:
Dr. James Eagan graduated from Emory University in 2009 with a B.S. in Chemistry summa cum laude and received a Ph.D. in Chemistry from Columbia University in 2014.

Following his doctoral studies, he studied the synthesis and properties of polyolefin block copolymers under the guidance of Professor Geoffrey W. Coates at Cornell University. This research focused on combining the two most abundant plastics, polyethylene and polypropylene, into mechanically tough blends through the use of novel multiblock copolymers.

He worked for Aramco Performance Materials as a lab scientist between 2017 and 2019 and is the cofounder of Exsponge Inc., director of chemistry for Ascribe Bioscience, and recipient of the 2017 Newcomb Cleveland Prize.

Research in the Eagan lab is focused on how plastics can pragmatically address the needs of today, without compromising the future. Plastics are essential to modern life. However, the pervasive use and careless disposal of these materials has resulted in economic wastefulness and created an environmental catastrophe. Utilizing the tools of chemistry and catalysis, the lab synthesizes new polymeric materials for sustainable applications. These polymers provide tools for understanding polymer behavior and technologies for improving recycling, polymer degradation, and enhancing polymer performance.