

Circular Plastics: Optimization & End-of-Life

PhD Candidate: Jeovan Araujo

Towards Circularity for Petroleum- and Bio-Based Plastics: Tailoring Properties and End-of-Life Routes

Ubiquitous post-consumer plastic waste is often physically mixed combining recalcitrant petroleum-based plastics together with bioplastics, forming (petro-bio)plastic streams. The development of bio-based plastics with enhanced properties such as mechanical, thermal, antimicrobial, antioxidant, colour stability, and circularity are essential as alternatives to mainstay synthetic conventional petroleum-based plastics en route to support the transition to the circular economy for plastics. Bioplastics and fossil fuel-based plastics are typically disposed of jointly or are indeed manufactured in intricate layers to achieve product such as packaging for shelf life extension. This inherent mixing of these streams means even existing advanced sorting techniques are unable to economically separate these (petro-bio)plastic streams, resulting in the dramatic deterioration of the original properties of the component plastics in particular petroleum-based plastic waste recycling streams where mechanical recycling becomes ineffective. Jeovan Araujo's PhD research is developing new circular plastics with tailored properties and advancing end-of-life strategies for mixed (petro-bio)plastic waste, which is highly pertinent in achieving environmental protection, sustainability for plastic value chain industries including recyclers and government policy makers worldwide.