

Upcycling of PET-containing waste streams towards terephthalamide and BTX aromatics: A novel example of a plastic refinery!

Improved sorting and collection systems, novel mechanical and chemical recycling strategies, and, recently, concepts such as design for circularity have already contributed to the circularity of plastics. However, most of the recycling strategies, including mechanical and chemical recycling, are only effective for homogeneous plastics. The fact that most of the end-of-life plastic waste streams are mixed plastic streams hampers recycling significantly.

Within our presentation, we will give examples of a plastic refinery concept in which mixed PET containing waste streams are converted via an ammonolysis (depolymerization using NH_3) to a high-value intermediate (terephthalamide), and separated from residual materials. The latter compound is converted to p-phenylenediamine and polymerized towards Twaron (poly(p-phenyleneterephthalamide) (PPTA)), a strong polyaramide fiber often used in tyres/ballistics. Residual material is converted to aromatics (BTX) using a catalytic pyrolysis approach. The refinery concept is also used for the conversion of DKR350 in pyrolysis oil, BTX, and, terephthalamide.