Polyethylene terephthalate (PET) is used in textile and packaging industries.

PET accounts for 29% of all the plastic waste generated. According to EPA’s Advancing Sustainable Materials Management Fact Sheet 2020, out of 33.68 Million tons of plastic waste generated 3.09 million tons were recycled and 75.5% of the plastic waste ended up in landfills.

Chemical recycling is identified as the best way to recycle plastic. It is the process where the plastic polymers are converted into smaller units called monomers.

Solution is Research in the labs!

How can we recover PET from this?

Post Run Analysis

PET Hydrolysis as a function of Temperature

- Extraction process includes centrifuging to separate solid residues from aqueous fractions.
- After separating ethylene glycol, remaining residue contains PET and TPA.
- Terephthalic acid is converted into a soluble sodium salt to separate it from unreacted PET.

Time vs. Yield at 3 different temperatures

- Figure (left) PET conversion at varying temperatures
- Low conversions observed at temperatures less than 250 °C
- Similar conversions at temperatures ≥250 °C

Conclusions & Future Work

- During my short experience in this research work I have learned that % conversion of PET into Ethylene glycol and Terephthalic acid increases with more Reaction time and Reaction temperature.
- In future I would like to run hydrolysis of PET under wider temperature and time ranges. I would also like to run the hydrolysis with an environmentally friendly catalyst to see if the % conversion is higher.

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References