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Chemical Recycling of Mixed Polyolefins

Aim

Optimize polyolefin pyrolysis oil through experimental work, statistical analysis and modelling

Justification

Chemical recycling of polyolefins, mainly pyrolysis, is considered one of the most promising methods for achieving plastic circularity. Currently, significant efforts are being made in academia and industry (DOW, Total Energies, Borealis, Sabic) to better understand how plastics can be effectively recycled and reused. However, due to the complex composition of plastic waste, the process still needs optimization and scaling up.

Currently, we have a good understanding of the results of each type of plastic. However, we lack an understanding of the pyrolysis process when mixed plastics are used as input. As real plastic waste is typically mixed, we need to be able to answer questions such as: Can we adjust the composition of the input to increase naphtha production (the feedstock used to produce plastics)? Can the use of polypropylene decrease the overall energy requirement? Can we accurately predict the results of pyrolysis of real plastic waste if we know the composition of the input?

Program

- Experimental study of the pyrolysis of mixed polyolefins using LCT's dedicated experimental infrastructure (pyrolysis setup, GCxGC). The data will be statistically analyzed and used to develop models.
- Statistical analysis of the results – you will understand the basics of machine learning/data-based models
- Development of a model to predict pyrolysis results according to the pyrolysis input.

