

“Chemical Recycling - the Answer to Plastic Waste?”

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The complexities of recycling of plastic waste are many. First of all the complexity of the feedstock and the fact that many reactions are occurring simultaneously makes it very challenging for chemical engineers. Also on the reactor level no consensus exist on what is the optimal design for each feed type, not even on what is the best "chemical recycling" option because of the varying economics and different government incentives Worldwide. If we could predict how the product distribution and conversion depends on the feedstock composition, reaction conditions and assess process operation issues, we could rationally design and optimize the system on the computer. The first step is to identify all the important species and reactions; this can be done using automatically or by hand with different levels of complexity. Unfortunately, we seldom have enough experimental data to determine the rate parameters for all the important reactions. Moreover, the data that is typically available does not allow to determine intrinsic kinetics, not even to close to mass balances. With novel experimental and computational techniques we currently try to improve our understanding of chemical recycling, but still a huge step for mankind is needed to come to truly fundamental understanding of chemical recycling. Information from 4 bench scale units and 3 pilot units is used to take chemical recycling to a new level at Ghent university.