

KIT and LyondellBasell conduct joint research on catalytic pyrolysis for plastics recycling

Since 2018, the ITC has been cooperating with Lyondellbasell, one of the world's leading plastics manufacturers, to advance the recycling of polyolefin-containing plastic waste using catalytic pyrolysis.



Liquid product of the catalytic pyrolysis of polyolefins.

Within the cooperation, the partners are focusing on the catalytically enhanced pyrolysis of polyethylene- and polypropylene-rich plastic waste. The focus is on packaging materials, as these cannot currently be fully recycled using mechanical processes, despite their high proportion of total waste. This is due to possible contamination or their composition (e.g. as composite packaging).

The expertise of Lyondellbasell is in the fields of plastics synthesis, upgrading of hydrocarbons, and catalysis. This experience complements the experimental capabilities of the ITC which allow evaluating mass and energy balances and yields of specific products. In addition to the process technology, the influence of different feedstocks including their impurity components, as well as the respective properties of different catalyst types are investigated.

The objective is to convert the long-chain polymers within a low-quality waste mixture into new chemical base materials in an efficient process, which are to serve as secondary feedstock for plastics syntheses. Complementary to mechanical recycling, chemical recycling in the form of catalytic pyrolysis contributes to the fulfillment of higher recycling quotas and a resource-saving circular economy.