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Abstract: From Plastic Waste to Ethylene: Steam Cracking of Supercritically Produced Naphtha

Abstract:

Chemical recycling has to meet a series of significant challenges if the EU is able to achieve a low carbon, circular material economy.

Much attention has been focused on different conversion technologies and the quality and throughput of the waste plastic feedstock that they can process. But for commercial success, and ultimately to drive the waste-to-resource ecosystem, chemical recycling needs to be capable of delivering high quality circular hydrocarbons at meaningful quantities that align with the liquid cracker capacities operated by petrochemical offtakers. Less focus has been on how those circular hydrocarbons are processed into ethylene and propylene and the degree of product upgrading needed between chemical recycling and supply to offtakers.

This presentation investigates the conversion of plastic waste into ethylene using the Mura Hydro-PRT® technology, which integrates supercritical water conversion with steam cracking. The results indicate that Hydro-PRT naphtha offers a stable and efficient feedstock for steam cracking, that can be processed in industrial furnaces with no, or minimal upgrading. This has important implications for the efficiency of the circular system, minimising losses in the material flow and the application of mass balance allocation to maximise recycled material credits for the value chain.

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