

Effect of feedstock composition and contamination on liquid pyrolysis products of commercial grade plastics

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Pyrolysis of waste plastic materials is increasingly becoming one of the most viable options, not only as a waste reduction route, but as an economical process which produces valuable chemical feedstock materials and high energy content fuels. In this work commercial grade polyethylene, polypropylene, polystyrene and their mixtures, were subjected to an isothermal pyrolysis process and distillation in a simple semi-batch laboratory system. This project provides useful data on products from single polymers as well as their mixtures as liquid distillates were characterized by gas chromatography, H NMR and FT-IR spectroscopy. Secondly this project presents a method of influencing pyrolysis oil composition by modification of the feedstock mixture. Furthermore, it was shown how the total process time and liquid product yield affects the hydrocarbon type distribution in various feedstock mixtures. Finally, in this work, the effect of feedstock contamination with toner powder was investigated for the first time. It was shown that the contamination of up to 20% wt. of feedstock does not significantly affect liquid distillate composition.