A STRATEGY OF THE PYROLYSIS OF COMMINGLED WASTE PLASTICS FOR PRODUCTION OF HALOGEN(Cl, Br) FREE LIQUID FUELS

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Abstract

Worldwide plastic industry witnessed a steady growth in recent years, which reflected in the increased consumption of all types of plastic materials. World-wide, the plastic and polymer consumption will have an average growth rate of 5% and may touch a figure of 227 million tons by 2015.

The pyrolysis of non-halogenated polyolefins for production of chemical feedstock/fuels is well known process today. However, the pyrolysis of polyolefins commingled with the halogenated (chlorinated and brominated) plastics produces the various halogenated (organic and inorganic) hydrocarbons in pyrolysis products and removal of such halogen compounds is inevitable important issue for acceptable recycling/reuse processing technology.

We have been involved with research/development of the dehalogenation processes related to commingled plastics derived liquid fuels using the existing municipal plastic waste and the model mixed plastic waste composed of such as PVC, PVDC, HIPS-Br, ABS-Br, PET, ABS, PS, PP and PE.

We have reported several processes such as (1)Ca–based sorptive dehalogenation, (2)Fe-based catalytic dehalogenation, (3)Ammonium fixation for debromination, (4)Fe-carbon and/or Ca-carbon composite for dehalogenation, and (5)Selective temperature operation for dehalogenation.

We present the pyrolysis of PVC or HIPS-Br containing commingled polyolefins liquid products with the very low halogen compounds without the use of any catalyst or sorbents. Considering the independent degradation behavior of polyolefin, the optimization of process parameters is more effective in controlling the quantity and quality of pyrolysis products.

Keywords: *pyrolysis, commingled plastic waste, halogen (Cl, Br) free plastic derived oil (PDO).*