

Production of fuels from waste plastic and sewage sludge via thermo-chemical routes

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Abstract

Plastics waste has attracted widespread attention in India, particularly due to its non-biodegradable and toxic nature. According to the CPCB report (2008) around 8 MT of plastic is consumed in India annually, out of this about 70% is coming as waste. Only 60% of the total waste plastic is recycled and the rest is uncollected and left indiscriminately on open lands, rivers, drains, landfill sites and coasts. The littered plastic waste mostly contains polyethene carry bags, disposable tableware, packaging, etc. In addition approximately, 9500 tones of sewage sludge is generated in India per day out of which, only 30% is treated in STPs. Adopting environment friendly waste-to-energy (WTE) technologies to treat the toxic plastic waste and sludge with simultaneous production of value added products is considered to be sustainable. Integrating WTE with plastic waste management, the present study is projected to focus on the generation of fuels viz., hydrogen, methane and hydrocarbons by adapting thermo-chemical routes. A specially designed pyrolysis reactor was used to perform the experiments in a packed bed configuration. The comparison between non-catalysed and sand catalysed pyrolysis for the yield and composition of products at different temperatures (673 K to 873 K) were done.

Keywords: Synthetic plastic, Sludge, Pyrolysis, Hydrogen, Solid waste treatment