BI 07 Design of a domestic type machine for de-polymerizing solid waste of polyolefin to a usable hydrocarbon fuel

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As landfill and incineration become more expensive and less accepted, the recycling of plastic wastes is gaining increasing importance. More emphasis is thus being given to new disposal options, which have high energy recovery values and are more environmentally attractive. Pyrolysis is one promising method for the treatment of mixed and contaminated plastic wastes. Plastics are thermally degraded to produce useful liquid hydrocarbons, which can then either be added to existing fuel or solvent product, or returned to a refinery where they can be added to the feedstock. Thermal and thermal catalytic cracking of waste polymers was carried out as a suitable technique for converting plastic polymers into liquid hydrocarbons, which could be used as a hydrocarbon fuel. The thermal cracking of waste plastics (polyolefin's) was investigated in a semi batch reactor over different temperatures, pressures and reaction times. The effects of above parameters on the liquid and gas yield are discussed. The temperature range of 350 – 400 ^{0}C, pressure range of 0 - 5 bar and reaction time of 2.5 - 4 hours was used in the process. Thermal cracking experiments carried out at different temperature, pressure and reaction time combinations have shown that this semi batch reactor is suitable for polyolefin cracking towards the liquid and gas hydrocarbon. A liquid hydrocarbon yield up to 30% and gas yield up to 45% were obtained by using the reactor.

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