Mixed plastic wastes Pyrolysis in a fluidized bed reactor for potential diesel production

ABSTRACT

Disposing of waste to landfill has becoming undesirable to the legislation pressures, rising costs and the poor biodegradable quality of polymer used. Feasible study on converting mixed plastic wastes by applying catalytic pyrolysis into valuable products had been carried out. Thermogravimetric analysis under various heating rates and particle sizes were determined. A 15 g/h of fluidized bed lab scale of fast pyrolysis unit was used. The pyrolysis processes were carried out at temperature of 400ºC for 2 hours in non-catalytic and catalytic conditions with ratio catalyst to mixed plastic waste of 10:90. The properties of liquid products were analysed and compared using Fourier Transform Infrared Spectroscopy (FTIR) and High-Pressure Liquid Chromatography (HPLC). Under the experimental conditions, the maximum liquid yields with and without catalyst were 20 and 35 ml, respectively. FTIR results revealed that those functional groups detected are similar with commercial diesel together with HPLC results indicating diesel concentration.

Keyword: Mixed plastic wastes; Pyrolysis; Catalytic; Diesel