Experimental Analysis of the Oxidative Liquefaction of the Municipal Solid Wastes

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Introduction and motivation

According to the European Union (EU) Waste Framework Directive hierarchy, the disposal of waste without recovery of any form of energetic or material potential should be avoided. Nowadays, one of the biggest challenges of the waste management sector is the incoming supply of municipal solid wastes (MSW's). This stream of waste require modern waste management and recycling approaches. The ultimate and proximate analysis of MSW samples revealed a higher carbon content, indicating significant potential for conversion into secondary carbon-based compounds. To achieve this, oxidative liquefaction of MSW was conducted, with key parameters of interest including temperature, pressure, oxidant concentration, reaction time, and waste-to-liquid ratio. These parameters were tested within a range of 200-350 °C, 20-40 bar, 15-60%, 30-90 minutes, and 3-25%, respectively. As a result, total polymer degradation (TPD) was observed for MSW, and the outcomes were satisfactory. This encourages the decomposition of primary waste into liquid oxygenated chemical compounds (OCCs).

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