



## Production of Hydrocarbon Feedstocks from Pyrolysis of Natural Rubber and Scrap Tyre: Preliminary Study

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There has recently been extensive attention to recovering waste or developing renewable sources as alternatives to petroleum-based substances. Natural rubber and scrap tyre can be potential sources of hydrocarbon feedstocks, e.g. propylene, benzene, toluene, etc., since they mainly contains hydrocarbon compounds. This work investigated the possibility of producing hydrocarbon feedstocks from pyrolysis of both materials. Pyrolysis-gas chromatography mass spectrometry (Py-GCMS) was employed to pyrolyse the natural rubber and scrap tyre as well as characterise volatile products. The effect of temperature, refinery catalysts (CoMo A, CoMo B and FCC) and natural clays (kaolin, halloysite, montmorillonite and sepiolite) on yield and product distribution were examined. Results show that yield of hydrocarbon feedstocks increases with temperature for both natural rubber and tyre, i.e. from 0%wt and 2.31%wt at 400°C to 21.8%wt and 29.38%wt at 800°C, respectively. Isoprene and limonene are primary pyrolysis products of both materials at low temperatures. However, due to its conversion to aromatics at elevated temperatures, limonene from natural rubber and tyre decreases with increasing temperature, e.g. 23.4% wt and 9.40%wt at 400°C to 0.45%wt and 0%wt at 800°C, respectively. FCC is the most effective among the refinery catalysts investigated, whereas, of all natural materials, montmorillonite is the most active clay.

**Keywords:** Hydrocarbon feedstocks; Pyrolysis; Natural rubber, Tyre; Pyrolysis-gas chromatography mass spectrometry (Py-GCMS); Refinery catalysts; Natural clays