

Research Title: Production of Liquid Fuel from Waste Lube Oil by Pyrolysis
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ABSTRACT

This research made a prototype stirred tank reactor for pyrolysis waste lube oil and studied pyrolysis conditions to produce liquid fuel. The experiment was carried out in the reactor at 60 rpm under vacuum conditions. Factors affecting on the yield of liquid fuel were investigated by varying pyrolytic temperatures at 200, 300, 350, 400, 500 °C, purge nitrogen gas flow rates at 0.1, 0.45, 0.75, 1.0 L/min and pyrolytic times at 1, 2, 3 hrs. Physical and chemical characteristics of the obtained liquid fuel and the remained waste lube oil were analyzed using ASTM methods and their chemical compositions were examined by GC-MS. The experimental results showed that pyrolytic temperature at 350 °C, nitrogen gas flow rate at 0.45 L/min and pyrolytic time for 2 hrs were the optimum conditions for producing liquid fuel from waste lube oil. 54.53 % by vol of liquid fuel were obtained from this study. It was found that liquid fuel contained high heating value. Flash point, viscosity, sulfur content, water and sediment content and ash content of liquid fuel were less than those of waste lube oil. Components of liquid fuel contained more light hydrocarbons, aromatic hydrocarbons, PAHs than those of waste lube oil.

Keywords: prototype stirred tank reactor, pyrolysis, waste lube oil, liquid fuel