

BSTRACT

Penelitian ini bertujuan untuk menganalisis pengaruh variasi komposisi bahan baku limbah plastik *Polypropylene* (PP) dan *Polyethylene Terephthalate* (PET) terhadap karakteristik minyak hasil pirolisis. Proses pirolisis dilakukan menggunakan reaktor tipe *batch* berkapasitas 2 kg pada suhu konstan 400°C dengan waktu tinggal selama 60 menit, menggunakan variasi bahan PP murni, PET murni, campuran PP 75% + PET 25%, dan campuran PET 75% + PP 25%. Hasil pengujian menunjukkan bahwa penambahan fraksi PET linier dengan peningkatan nilai densitas minyak, di mana densitas tertinggi diperoleh pada PET murni sebesar 0,994 g/mL dan terendah pada PP murni sebesar 0,964 g/mL. Sebaliknya, performa energetik dan kuantitas produk cair didominasi oleh fraksi PP; minyak PP murni menghasilkan nilai kalor tertinggi sebesar 10.535,76 Cal/gram dengan volume cairan maksimal mencapai 390 ml (*yield* 0,33%), sementara campuran PET 75% + PP 25% menghasilkan nilai kalor terendah (8.266,82 Cal/gram) serta volume minyak paling sedikit yaitu 280 ml (*yield* 0,29%). Dengan demikian, penggunaan bahan baku PP murni atau campuran yang didominasi oleh PP jauh lebih unggul dan efektif untuk menghasilkan bahan bakar alternatif dengan kuantitas melimpah dan kualitas energi yang tinggi.

Kata Kunci: Pirolisis, Sampah Plastik, PP, PET, Bahan Bakar Cair, Densitas, Nilai Kalor.

ABSTRACT

This study aims to analyze the effect of variations in the composition of raw materials of Polypropylene (PP) and Polyethylene Terephthalate (PET) plastic waste on the characteristics of pyrolysis oil. The pyrolysis process was carried out using a batch-type reactor with a capacity of 2 kg at a constant temperature of 400°C with a residence time of 60 minutes, using variations of pure PP, pure PET, a mixture of 75% PP + 25% PET, and a mixture of 75% PET + 25% PP. The test results showed that the addition of PET fractions was linear with an increase in oil density values, where the highest density was obtained in pure PET at 0.994 g/mL and the lowest in pure PP at 0.964 g/mL. In contrast, the energetic performance and quantity of liquid products were dominated by the PP fraction; Pure PP oil produced the highest calorific value of 10,535.76 Cal/gram with a maximum liquid volume of 390 ml (yield 0.33%), while a mixture of 75% PET + 25% PP produced the lowest calorific value (8,266.82 Cal/gram) and the smallest oil volume of 280 ml (yield 0.29%). Therefore, the use of pure PP raw materials or a mixture dominated by PP is far superior and effective for producing alternative fuels with abundant quantities and high energy quality.

Keywords: Pyrolysis, Plastic Waste, PP, PET, Liquid Fuel, Density, Calorific Value.