

INTISARI

Sampah plastik yang dibuang secara sembarangan dapat menimbulkan dampak negatif terhadap lingkungan karena plastik merupakan bahan yang tidak mudah terurai. Plastik yang berbahan dasar dari minyak bumi, dapat dikembalikan ke bentuk asalnya dengan proses pirolisis pada suhu tinggi dan tanpa oksigen. Namun minyak yang dihasilkan dari proses pirolisis masih merupakan bahan bakar campuran, berwarna gelap, dan mengandung padatan pengotor sehingga mengurangi kualitas minyak cair. Oleh karena itu, dilakukan proses pemisahan komponen fraksi ringan dan fraksi berat dengan distilasi kolom bahan isian. Tujuan penelitian ini adalah mempelajari karakteristik minyak distilat dari proses distilasi kolom dengan variasi tinggi bahan isian dan jenis bahan isian.

Percobaan dimulai dengan memasukkan 400 ml minyak hasil pirolisis ke dalam labu distilasi yang dilengkapi kolom bahan isian berisi kaca atau zeolit dengan variasi tinggi 5-15 cm. Kemudian, minyak dipanaskan dengan mengatur voltage regulator pada tegangan 140 volt. Waktu distilasi dimulai setelah distilat pertama terbentuk dan kemudian suhu didih dan suhu uap dicatat. Setiap 10 menit, volume distilat yang diperoleh dicatat hingga tidak terjadi tetesan lagi. Sampel distilat yang diperoleh dianalisis berdasarkan komposisi hidrokarbon, densitas, *specific gravity*, viskositas kinematik, dan nilai kalor. Pemanasan dilanjutkan dengan menaikkan tegangan listrik pada 180 volt dan 220 volt.

Hasil penelitian menunjukkan bahwa karakteristik minyak distilat dari proses distilasi kolom pada tinggi bahan isian 5 cm, 10 cm dan 15 cm tidak menunjukkan perbedaan secara signifikan. Hal serupa juga terjadi terhadap perbandingan minyak distilat dari proses distilasi dengan kolom bahan isian kaca dan zeolit yang tidak menunjukkan perbedaan secara signifikan. Hal ini disebabkan tinggi bahan isian tersebut terlalu rendah sehingga pemisahan komponen hidrokarbon belum terjadi.

Kata kunci: distilasi, bahan isian, minyak distilat

ABSTRACT

Plastic waste that is disposed carelessly can give a negative impact on the environment since it does not decompose easily. Petroleum based plastic can be recycled back into oil or origin compounds by pyrolysis process at high temperature and with the absence of oxygen. However, the oil produced by pyrolysis is a mixed components and contains some impurities, such as solid residue, moisture, and dark color oil. This decreases the quality of the liquid oil, so it cannot be used directly and requires further treatments. Hence, this pyrolysis oil problem can be found by packed column distillation, which can reduce heavy components and light component in pyrolysis oil. The purpose of this research was to study the characteristics of distillate oil from the column distillation process with variations in the height of the packing and the type of packing.

Four hundreds ml of crude plastic oil was put into the distillation flask equipped with a packed column containing glass beads or zeolite as a packing with variations of height 5-15 cm. Then, it is boiled by adjusting the voltage regulator of the heating mantle at 140 V. The distillation time was started after the first drop of distillate formed and then the boiling point and dew point are recorded. Each 10 minutes, the volume of distillate obtained is recorded. The distillation process was stopped when there was no more distillate coming out from the condenser. The collected distillate samples were analyzed in terms of hydrocarbon composition, density, specific gravity, kinematic viscosity and heating value. Then, the heating process is continued by increasing the voltage at 180 V and 220 V.

The results showed that the characteristics of distillate oil from the packed column distillation at height of 5 cm, 10 cm, and 15 cm did not show a difference results. The same results can be observed to the comparison of distillate oil from the distillation process with packing of glass bead and zeolite in which did not show differences results. This is due to the height of packing is too low so that the separation of hydrocarbon components does not occur.

Keywords : distillation, packing, distillate oil