Pemanfaatan limbah plastik (polystyrene) menjadi liquid oil dengan menggunakan metode pirolisis = Utilization of plastics waste (polystyrene) into liquid oil by using pyrolysis method

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Abstrak

Peningkatan jumlah sampah plastik di Jakarta menimbulkan beberapa permasalahan lingkungan. Untuk mengatasi permasalahan tersebut, dibuat metode pengolahan sampah plastik khususnya polystyrene dengan metode pirolisis. Tujuan penelitian ini yaitu mengetahui karakteristik liquid oil produk pirolisis serta menganalisis perpindahan kalor pada reaktor dan cooling water serta kesetimbangan energi untuk mengubah polystyrene menjadi liquid oil. Pirolisis polystyrene dilakukan dengan memvariasikan temperatur reaksi 350 C-550 C serta dikondensasi menggunakan temperatur air dingin dan air biasa. Hasil liquid oil optimum berada di temperatur 500 C dengan air dingin. Liquid oil dapat digunakan sebagai bahan bakar dengan komposisi utamanya yaitu 60.33 berupa Benzocyclobutane serta memiliki nilai kalor sebesar 43.83 MJ/kg, dengan densitas 0.89 g/ml, serta viskositas kinematik 0.78 cSt.

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The increase of plastics waste in Jakarta has created some problems. Processing plastic waste, particularly polystyrene, using a pyrolysis method can be a solution to these problems. The purpose of this research is to obtain the characteristics of liquid oil as pyrolysis product and analyze heat transfer at the reactor and cooling water then the energy balance for producing liquid oil. The polystyrene pyrolysis method was done through temperature reactions varied from 350 550 C, also condensed by using low and normal temperature of water. The optimum result of liquid oil was produced in temperature reaction of 500 C using cold water. Utilization of this liquid oil can be used as fuel, with 60.33 Benzocyclobutane as the main composition and it has heating value equals to 43.83 MJ kg, with 0.89 g ml density, and 0.78 cSt kinematic viscosity.