ABSTRAK

SINTESIS BAHAN BAKAR MINYAK DARI SAMPAH HDPE KRESEK BERDASARKAN PIGMENTASI WARNA

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Abstrak

Sampah plastik jenis *High Density Polyethylene* (HDPE), khususnya plastik kresek, merupakan permasalahan lingkungan yang semakin meningkat karena sifatnya yang sulit terurai dan volumenya yang terus bertambah. Plastik kresek memiliki variasi pigmentasi warna seperti hitam, merah, dan bening, yang menunjukkan perbedaan kandungan pigmen serta bahan aditif dan diduga memengaruhi kualitas produk hasil pengolahan. Salah satu alternatif pengelolaan sampah plastik yang berpotensi mengurangi pencemaran lingkungan sekaligus menghasilkan nilai tambah adalah teknologi pirolisis. Penelitian ini bertujuan untuk menganalisis kualitas bahan bakar minyak (BBM) yang dihasilkan dari sampah plastik kresek HDPE berdasarkan perbedaan pigmentasi warna serta membandingkan volume BBM yang dihasilkan terhadap berat bahan baku. Metode penelitian yang digunakan adalah metode eksperimen dengan proses pirolisis pada suhu 250–300°C dalam kondisi tanpa oksigen. Sampel plastik kresek HDPE berwarna hitam, merah, dan bening diuji karakteristik BBM-nya meliputi densitas, viskositas, *Research Octane Number* (RON), dan *specific gravity* (SG). Hasil penelitian menunjukkan bahwa perbedaan pigmentasi warna berpengaruh terhadap kualitas BBM yang dihasilkan. Plastik kresek bening menghasilkan BBM dengan karakteristik paling mendekati bahan bakar konvensional, ditandai dengan nilai Research Octane Number (RON) yang lebih tinggi serta densitas dan viskositas yang lebih stabil. Plastik kresek merah menunjukkan kualitas menengah, sedangkan plastik kresek hitam menghasilkan BBM dengan kualitas relatif lebih rendah akibat kandungan pigmen dan pengotor yang lebih kompleks. Dengan demikian, pirolisis plastik kresek HDPE berpotensi menjadi solusi pengelolaan sampah plastik sekaligus sumber energi alternatif.

Kata Kunci: sampah plastik HDPE, pirolisis, pigmentasi warna, bahan bakar minyak, plastik kresek

ABSTRACT

SYNTHESIS OF OIL FUEL FROM HDPE CRYSTAL CREAM WASTE BASED ON DIFFERENCES IN COLOR PIGMENTATION

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ABSTRACT

Plastic waste, particularly High Density Polyethylene (HDPE) plastic bags, represents a growing enviResearch Octane Number (RON)mental problem due to its non-biodegradable nature and increasing volume. HDPE plastic bags are commonly found in various color pigmentations such as black, red, and transparent, which indicate differences in pigment and additive content that may influence the quality of products generated through thermal processing. One alternative method for managing plastic waste while providing added value is pyrolysis technology. This study aims to analyze the quality of fuel oil produced from HDPE plastic bag waste based on color pigmentation differences and to compare the volume of fuel oil produced relative to the initial mass of the raw material. The research employed an experimental method using a pyrolysis process at temperatures of 250–300°C under oxygen-free conditions. HDPE plastic bag samples in black, red, and transparent colors were processed, and the resulting fuel oil was evaluated based on density, viscosity, Research Octane Number (Research Octane Number (RON)), and specific gravity (SG). The results indicate that color pigmentation significantly affects the quality of the fuel oil produced. Transparent HDPE plastic bags generated fuel oil with characteristics closest to conventional fuel, as indicated by higher Research Octane Number (RON) values and more stable density and viscosity. Red plastic bags produced fuel oil of moderate quality, while black plastic bags resulted in relatively lower-quality fuel due to the presence of more complex pigments and impurities. These findings demonstrate that the pyrolysis of HDPE plastic bag waste has stResearch Octane Number (RON)g potential as an alternative plastic waste management solution and a source of alternative energy.

Keywords: HDPE plastic waste, pyrolysis, color pigmentation, fuel oil, plastic bags