

ABSTRAK

PENGARUH VARIASI UKURAN PARTIKEL BATUBARA SUB-BITUMINUS TERHADAP *YIELD COAL TAR* HASIL PIROLISIS

(Syatila Aisyah Berliani, 2026, 40 Halaman, 8 Tabel, 13 Gambar)

Penelitian ini bertujuan mengkaji pengaruh ukuran partikel terhadap *yield coal tar* pada pirolisis batubara sub-bituminus sebagai upaya pemanfaatan batubara peringkat rendah menjadi energi alternatif. Metode penelitian dilakukan dengan memvariasikan ukuran partikel batubara 5 mm, 10 mm, 15 mm, 20 mm, dan 25 mm dalam reaktor tanpa oksigen pada suhu konstan 300 °C dengan *holding time* 1,5 jam. Hasil penelitian menunjukkan bahwa variasi ukuran partikel berpengaruh nyata terhadap kuantitas dan kualitas *coal tar*. *Coal tar* terendah diperoleh pada ukuran 5 mm dengan volume 39 mL dan *yield* 1,21%. Ukuran partikel paling optimal dicapai pada ukuran terbesar yaitu 25 mm, menghasilkan volume produk maksimal 60 mL dengan *yield* 1,85%. Karakteristik fisik *coal tar* optimal pada ukuran 25 mm menunjukkan sifat aliran encer dengan viskositas terendah 166,74 mm²/s, densitas 0,9244 gr/mL, *flash point* 107,1 °C, dan *fire point* 116,0 °C. Hal ini mengindikasikan bahwa ukuran partikel 25 mm memicu batasan transfer panas (*heat transfer limitation*) yang ideal untuk mendukung reaksi perengkahan sekunder (*secondary cracking*) terkendali, sehingga mengoptimalkan pembentukan senyawa hidrokarbon fraksi ringan yang mudah terkondensasi menjadi *coal tar*.

Kata Kunci: Batubara Sub-Bituminus, Pirolisis, Ukuran Partikel, *Yield Coal Tar*.

ABSTRACT

THE EFFECT OF SUB-BITUMINOUS COAL PARTICLE SIZE VARIATION ON COAL TAR YIELD FROM PYROLYSIS

(Syatila Aisyah Berliani, 2026, 40 Pages, 8 Tables, 13 Figures)

This study aims to examine the effect of particle size on coal tar yield during the pyrolysis of sub-bituminous coal, as an effort to utilize low rank coal for alternative energy. The research method involved varying coal particle sizes 5 mm, 10 mm, 15 mm, 20 mm, and 25 mm in an oxygen free reactor at a constant temperature of 300 °C with a holding time of 1.5 hours. The results indicate that particle size variation significantly affects both the quantity and quality of the coal tar. The lowest coal tar yield was obtained at a particle size of 5 mm, with a volume of 39 mL and a yield of 1.21%. The optimal particle size was the largest one tested, 25 mm, which produced a maximum product volume of 60 mL and a yield of 1.85%. The physical characteristics of the coal tar obtained at the 25 mm size showed low viscosity flow properties, with the lowest viscosity at 166.74 mm²/s, a density of 0.9244 g/mL, a flash point of 107.1 °C, and a fire point of 116.0 °C. This indicates that the 25 mm particle size created heat transfer limitations ideal for supporting controlled secondary cracking reactions, thereby optimizing the formation of light-fraction hydrocarbon compounds that readily condense into coal tar.

Keywords: Sub-bituminous Coal, Pyrolysis, Particle Size, Coal Tar Yield.