

## **ABSTRAK**

### **PENGARUH VARIASI KOMPOSISI BATUBARA *LIGNITE*, *COALITE* DAN *MOLASSES* TERHADAP KARAKTERISTIK KOKAS**

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**PRATIWI**

Batubara lignite merupakan batubara peringkat rendah dengan kadar air dan zat volatil tinggi sehingga kualitasnya kurang optimal meskipun ketersediaannya melimpah di Indonesia. Penelitian ini bertujuan mengetahui pengaruh variasi Komposisi K1 (80% *lignite*, 10% *coalite*, 10% *molasses*), K2 (70% *lignite*, 20% *coalite*, 10% *molasses*), K3 (60% *lignite*, 30% *coalite*, 10% *molasses*), dan K4 (50% *lignite*, 40% *coalite*, 10% *molasses*)., Proses karbonisasi dilakukan pada suhu 600°C selama 1 jam, kemudian sampel dianalisis melalui uji proksimat, X-Ray Diffraction (XRD), X-Ray Fluorescence (XRF), Fourier Transform Infrared Spectroscopy (FTIR), dan Scanning Electron Microscopy (SEM). Hasil penelitian menunjukkan bahwa variasi komposisi lignite dan coalite berpengaruh terhadap kadar air, kadar zat volatil, kandungan karbon tetap, serta struktur mikro kokas. Analisis XRF mengindikasikan dominasi unsur Si, Al, Fe, dan Ca, sedangkan XRD mengidentifikasi fasa kuarsa dengan struktur karbon yang lebih kristalin. Variasi K3 (60% lignite, 30% coalite, 10% molase) memberikan karakteristik terbaik dengan kadar air terendah (0,28%), zat volatil terendah (2,08%), serta struktur karbon yang lebih stabil. Dengan demikian, pemanfaatan *lignite* dan *coalite* dengan penambahan *molasses* sebagai perekat berpotensi meningkatkan kualitas kokas sehingga lebih layak untuk aplikasi industri.

**Kata kunci:** *Lignite*, *Coalite*, *Molasses*, Kokas, Karakterisasi

## **ABSTRACT**

### **THE EFFECT OF COMPOSITION VARIATIONS OF LIGNITE, COALITE AND MOLASSES COAL ON THE CHARACTERISTICS OF COKE**

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Lignite coal is a low-rank coal with high water and volatile content so that its quality is less than optimal even though its availability is abundant in Indonesia. This study aims to determine the effect of variations in Composition K1 (80% lignite, 10% coalite, 10% molasses), K2 (70% lignite, 20% coalite, 10% molasses), K3 (60% lignite, 30% coalite, 10% molasses), and K4 (50% lignite, 40% coalite, 10% molasses). The carbonization process was carried out at a temperature of 600°C for 1 hour, then the samples were analyzed through proximate tests, X-Ray Diffraction (XRD), X-Ray Fluorescence (XRF), Fourier Transform Infrared Spectroscopy (FTIR), and Scanning Electron Microscopy (SEM). The results showed that variations in the composition of lignite and coalite affected the moisture content, volatile matter content, fixed carbon content, and microstructure of coke. XRF analysis indicated the dominance of Si, Al, Fe, and Ca elements, while XRD identified a quartz phase with a more crystalline carbon structure. The K3 variation (60% lignite, 30% coalite, 10% molasses) provided the best characteristics with the lowest moisture content (0.28%), the lowest volatile matter (2.08%), and a more stable carbon structure. Thus, the use of lignite and coalite with the addition of molasses as an adhesive has the potential to improve the quality of coke, making it more suitable for industrial applications.

**Keywords:** Lignite, Coalite, Molasses, Coke, Characterization