ABSTRAK

PEMANFAATAN CHAR PIROLISIS BATUBARA SEBAGAI MATERIAL ELEKTRODA BATERAI

(Dian Pani Safitri, 2026: 75 Halaman, 20 Tabel, 25 Gambar)

Penelitian ini bertujuan untuk menganalisis pengaruh variasi temperatur pirolisis terhadap karakteristik char batubara sub-bituminus serta pengaruh karakteristik char terhadap kinerja baterai sel kering pada variasi konsentrasi elektrolit NaOH. Char dibuat melalui proses pirolisis pada temperatur 300°C, 400°C, dan 500°C selama 2 jam, kemudian diaktivasi menggunakan larutan KOH 12%. Karakteristik char dianalisis menggunakan uji proksimat, *iodine number*, dan *Scanning Electron Microscopy* (SEM), sedangkan kinerja baterai dievaluasi berdasarkan nilai tegangan, arus, dan daya. Hasil penelitian menunjukkan bahwa peningkatan temperatur pirolisis meningkatkan kualitas char yang ditandai dengan meningkatnya *fixed carbon*, *iodine number*, dan ukuran pori, serta menurunnya kadar air, kadar abu, dan *volatile matter*. Karakteristik terbaik diperoleh pada temperatur 500°C dengan *fixed carbon* 79,41%, *iodine number* 1487,11 mg/g, dan ukuran pori 8,71 µm. Kinerja baterai terbaik juga diperoleh pada temperatur 500°C dengan konsentrasi NaOH 2,5 M, menghasilkan tegangan 1,36 V, arus 7,80 mA, dan daya 10,61 mW. Hasil penelitian menunjukkan bahwa char pirolisis batubara sub-bituminus berpotensi sebagai material elektroda baterai sel kering yang bernilai tambah dan ramah lingkungan.

Kata Kunci:. Batubara Sub-bituminus, Char Pirolisis, Baterai Sel Kering, Material Elektroda, Temperatur Pirolisis.

ABSTRACT

UTILIZATION OF COAL PYROLYSIS CHAR AS BATTERY ELECTRODE MATERIAL

(Dian Pani Safitri, 2026: 75 *Pages*, 20 *Tables*, 25 *Figures*)

This study aims to analyze the effect of pyrolysis temperature variations on the char characteristics of sub-bituminous coal and the effect of char characteristics on the performance of dry cell batteries at various NaOH electrolyte concentrations. Char was made through a pyrolysis process at temperatures of 300°C*,* 400°C*, and* 500°C *for* 2 *hours, then activated using* 12% KOH *solution. Char characteristics were analyzed using proximate tests, iodine number, and Scanning Electron Microscopy (SEM), while battery performance was evaluated based on voltage, current, and power values. The results showed that increasing pyrolysis temperature improved the char quality as indicated by increasing fixed carbon, iodine number, and pore size, as well as decreasing water content, ash content, and volatile matter. The best characteristics were obtained at a temperature of* 500°C *with fixed carbon of 79.41%, iodine number of* 1487.11 mg/g*, and pore size of* 8.71 µm*. The best battery performance was also achieved at a temperature of 500°C with a NaOH concentration of 2.5 M, producing a voltage of* 1.36 V*, a current of* 7.80 mA*, and a power of* 10.61 mW*. The results indicate that sub-bituminous coal pyrolysis char has the potential to be a value-added and environmentally friendly dry cell battery electrode material.*

Keywords*: Sub-bituminous Coal, Pyrolysis Char, Dry Cell Battery, Electrode Material, Pyrolysis Temperature.*