

BAB V

KESIMPULAN DAN SARAN

5.1 Kesimpulan

Dari penelitian yang telah dilakukan, kesimpulan yang dapat diambil adalah sebagai berikut:

1. Penggunaan jumlah KOH yang semakin besar akan menurunkan perolehan massa dari karbon aktif, tetapi menghasilkan karbon aktif dengan morfologi struktur yang lebih berpori, luas permukaan lebih besar, serta komposisi unsur C yang tergolong besar, yaitu sebesar 90 % wt berdasarkan hasil analisis EDS.
2. Perbandingan rasio massa *hydrochar* terhadap KOH 1:3 memberikan hasil karbon aktif dengan morfologi struktur paling berpori dari hasil analisis SEM, luas permukaan terbesar yaitu sebesar 1159 m²/g dari hasil analisis BET, tetapi dengan perolehan massa karbon aktif yang terendah.
3. Penggunaan katalis FeCl₃ menghasilkan karbon aktif dengan morfologi struktur yang kurang berpori, luas permukaan lebih rendah, tetapi dengan % kristalinitas yang lebih tinggi, meskipun tidak terlihat adanya struktur *graphitic layer* yang terbentuk dari hasil analisis SEM dan XRD. Hal ini disebabkan karena konsentrasi katalis FeCl₃ yang digunakan cenderung rendah sehingga tidak memberikan pengaruh yang signifikan terhadap pembentukan struktur *graphitic layer* pada karbon aktif.
4. Komposit karbon sulfur yang dihasilkan memiliki struktur kristalin dengan komposisi unsur C sebesar 21,56 %wt dan unsur S sebesar 62,34 %wt berdasarkan hasil analisis EDS, serta dengan luas permukaan yang jauh lebih rendah daripada karbon aktif berdasarkan hasil analisis BET.
5. Terdapat beberapa perbedaan antara karbon aktif dan komposit karbon sulfur berdasarkan hasil analisis, yaitu karbon aktif memiliki puncak melebar yang landai, sedangkan komposit karbon sulfur memiliki puncak tajam berdasarkan hasil XRD. Berdasarkan hasil BET, karbon aktif memiliki luas permukaan yang jauh lebih besar daripada komposit karbon sulfur. Berdasarkan hasil EDS, karbon aktif didominasi oleh unsur C, sedangkan komposit karbon sulfur didominasi oleh unsur S pada komposisinya.

5.2 Saran

Dari penelitian yang telah dilakukan, terdapat beberapa kendala yang ditemukan. Oleh karena itu, terdapat beberapa saran yang dapat diberikan apabila penelitian ini dilanjutkan di masa yang mendatang yaitu:

1. Perlu dilakukan proses karakterisasi lebih lanjut terhadap TKKS dan *hydrochar* yang dihasilkan dengan melakukan analisis SEM dan XRD agar dapat diketahui perubahan yang terjadi dari proses karbonisasi hidrotermal yang dilakukan. Selanjutnya, hasil analisis SEM dan XRD dari *hydrochar* dapat digunakan untuk mengetahui perubahan yang terjadi dari proses aktivasi yang dilakukan.
2. Analisis komposit karbon sulfur dapat dilanjutkan dengan analisis SEM untuk mengetahui morfologi strukturnya.

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