BAB V

KESIMPULAN DAN SARAN

5.1. Kesimpulan

Berdasarkan hasil penelitian dan analisis yang telah dilakukan, maka dapat disimpulkan bahwa:

1. *Porous carbon* berhasil disintesis dari κ-karragenan melalui karbonisasi hidrotermal dan aktivasi kimia dengan variasi penggunaan aktivator $NaNH_2$ dan temperatur aktivasi. *Porous carbon* yang diperoleh memiliki struktur amorf, morfologi *spheroidal* dengan permukaan yang halus, kandungan unsur nitrogen pada rentang 0,5 – 1%, dan kapasitas adsorpsi pada rentang 140 – 160 mg/g.
2. Peningkatan rasio impregnasi menghasilkan *porous carbon* yang bersifat amorf dengan bentuk *spheroidal* dan menunjukkan peningkatan komposisi unsur nitrogen, tetapi perolehan *porous carbon* menunjukkan penurunan pada kondisi tersebut.
3. Modifikasi terhadap temperatur aktivasi berpengaruh terhadap struktur, morfologi, komposisi unsur nitrogen, dan perolehan *porous carbon*. Peningkatan temperatur aktivasi berakibat pada pembentukan struktur amorf dan morfologi *spheroidal* yang disertai peningkatan pada komposisi unsur nitrogen *porous carbon*. Akan tetapi, perolehan *porous carbon* menunjukkan penurunan.
4. Kapasitas adsorpsi *porous carbon* yang lebih tinggi daripada kapasitas adsorpsi karbon aktif komersial menunjukkan bahwa *porous carbon* yang disintesis memiliki kualitas performansi adsorpsi yang lebih baik.

5.2. Saran

Sebagai pertimbangan lanjut untuk pengembangan penelitian selanjutnya, berikut beberapa saran yang dapat diberikan.

1. Penambahan *dopant* nitrogen perlu dilakukan secara efektif melalui tahap karbonisasi hidrotermal untuk memperoleh komposisi nitrogen dalam *porous carbon* yang lebih besar.

2. Temperatur aktivasi pada aktivasi kimia menggunakan $NaNH_2$ dapat dilakukan pada rentang temperatur 400 ℃ – 600 ℃ untuk memastikan *dopant* nitrogen yang terimpregnasi tidak terdekomposisi.
3. Analisis terhadap sampel *hydrochar* dan *porous carbon* perlu dilakukan lebih lanjut dengan menggunakan XPS dan BET untuk meninjau eksistensi unsur nitrogen dan jenis pori secara lebih akurat.

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