BAB V

KESIMPULAN DAN SARAN

5.1 Kesimpulan

1. Karbon aktif dapat dihasilkan dengan 3 tahap (karbonisasi hidrotermal, aktivasi kimia, dan grafitisasi) maupun dengan 2 tahap (karbonisasi hidrotermal dan aktivasi kimia / karbonisasi hidrotermal dan grafitisasi) dimana masing-masing prosedur akan memiliki kelebihan dan kekurangan masing-masing atas produk karbon aktif yang dihasilkan.
2. Peningkatan temperatur grafitisasi akan mempengaruhi morfologi dan karakteristik dari karbon aktif dimana semakin tinggi temperatur grafitisasi maka akan semakin banyak struktur grafit yang terbentuk disertai dengan penurunan *surface area*, peningkatan nilai derajat grafitisasi, peningkatan nilai L_a dan L_c, dan penurunan nilai d_{002}.
3. Aktivasi kimia dengan KOH akan mendorong terbentuknya mikropori sehingga *surface area* karbon menjadi tinggi sedangkan penggunaan $FeCl_3$ sebagai katalis dapat meningkatkan nilai derajat grafitisasi. Penggunaan 3 tahap (karbonisasi hidrotermal, aktivasi kimia, dan grafitisasi) dapat menjadi solusi untuk mendapatkan *surface area* yang tinggi serta derajat grafitisasi yang tinggi pula walaupun akan terjadi *trade off* antara *surface* area dengan derajat grafitisasi. Dari hasil penelitian yang telah dilakukan ternyata sampel AC-800 yang merupakan hasil penelitian Evelyn (2021) memiliki luas permukaan terbesar hingga mencapai 1184,411 m^2/g. Dari karbon aktif yang dihasilkan dari 2 tahap dengan luas area terbesar tersebut sampel HPAC-x kemudian dihasilkan dengan melakukan grafitisasi pada sampel karbon aktif yang dihasilkan dengan 2 tahap dengan KOH sebagai *activating agent*. Setelah diberikan perlakuan grafitisasi, didapatkan nilai I_G/I_D, L_a, L_c, terbaik pada sampel HPAC-1000 secara berturut-turut sebesar 3,2850, 6,70 nm, dan 3,66 nm.

5.2 Saran

1. Penelitian ini masih dapat dikembangkan dengan memvariasikan rasio katalis $FeCl_3$ pada grafitisasi 3 tahap.
2. Metode 2 tahap perlu dikembangkan lagi untuk mendapatkan karbon aktif dengan spesifikasi yang mempuni tetapi dikerjakan dengan efisien dan praktis.

3. Perlu dilakukan analisa elektrokimia pada produk karbon aktif untuk mendukung pernyataan apakah produk yang dihasilkan pada penelitian ini cocok bila digunakan sebagai elektroda superkapasitor.

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