BAB V
KESIMPULAN DAN SARAN

V.1 Kesimpulan

Berdasarkan penelitan yang dilakukan, diperoleh komposit sel/Zn-BDC berbasis selulosa dari kulit durian didapatkan kesimpulan:

1. Selulosa berbasis kulit durian hasil pretreatment memiliki kemurnian sebesar 77,9% dan dapat digunakan untuk membentuk Sel/Zn-BDC. Komposit ini memiliki diameter dan panjang 200 nm dan 400 nm, serta memiliki bentuk seperti batang (*rod*). Sel/Zn-BDC memiliki luas area spesifik sebesar 12,24 m^2/g. Karakteristik ini didapatkan dengan perbandingan rasio selulosa: logam: ligand sebesar 2: 11: 2,5.
2. Studi kinetika yang sesuai untuk adsorpsi ini adalah *pseudo-second order yang menandakan adsorpsi yang berlangsung dikendalikan oleh adsorpsi kimia*. Adsorpsi dilakukan pada kondisi suhu 30°C, pH 3 dan selama 8 jam. Dari percobaan didapatkan R^2 sebesar 0,9894 pada suhu 30°C dan kapasitas maksimum *tetracycline* yang dapat diadsorpsi oleh sel/Zn-BDC sebesar 1173,6 mg. g^{-1}.
3. Studi isotherm adsorpsi yang menggunakan persamaan Freundlich menandakan bahwa permukaan dari sel/Zn-BDC tidak heterogen dan sistem adsorpsi *unfavorable*. Sementara itu, analisa BET didapatkan R^2 sebesar 0,9948 pada suhu 30°C menandakan bahwa mekanisme adsorpsinya adalah multilayer. Jumlah lapisan yang didapatkan dari persamaan BET ini adalah 20,99 lapisan (30°C); 24,93 lapisan (40°C); 41,97 lapisan (50°C). Dari analisa Harkin-Jura

diketahui bahwa orientasi tumbukan adsorpsi *tetracycline* dan sel/Zn-BDC terjadi secara vertikal.

4. Berdasarkan hasil perhitungan studi termodinamika didapatkan bahwa adsorpsi bersifat eksotermis. Adsorpsi ini berlangsung secara *chemisorption* yang dimulai secara spontan pada layer pertama dan menjadi tidak spontan di layer teratas.

V.2 Saran

Pada proses pretreatment kulit durian, khususnya setelah proses delignifikasi, dibutuhkan pencucian hingga pH kulit durian netral. Prosedur pencucian dapat dilakukan melalui siklus berulang perendaman dan penggantian air baru hingga pH mencapai netral. Hal ini agar dapat mengurangi kebutuhan akuades dan tenaga yang digunakan. Pada proses sintesa, pengadukan selulosa, logam dan ligand dapat dilakukan bersamaan dengan proses sonikasi untuk memastikan partikel MOF dapat terdistribusi dengan baik pada permukaan selulosa.

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