

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The effects of carbon dioxide on the methane adsorption on modified CSAC were investigated. For the competitive adsorption, carbon dioxide is more strongly adsorbed on the activated carbon than methane. Methane is a weakly adsorbed component, which has the breakthrough time at about 5 min. Methane roll up can be observed and the roll up reaches the highest concentration ratio at approximately 1.5 before it reverts to the equilibrium at about 20 min, while the carbon dioxide has the breakthrough time at about 17.5 min. The stability of adsorbent was studied. The result shows some adsorbents slightly affect the breakthrough curves. The methane selectivity was also studied for all adsorbents. The results illustrate that the increase in the methane selectivity of all modified adsorbents, especially the $\text{NH}_4\text{OH/CASC}$ with 0.005 wt% MTES. Moreover, the binary adsorption isotherm of methane and carbon dioxide is fit by using the Langmuir model with the relative error less than 20% between the experimental data and the predicted data.

5.2 Recommendations

Based on what has been discovered in this study, the following recommendations are suggested:

- 1) Find other surface modifying methods that can adjust the surface functional groups of the adsorbent to enhance the methane adsorption.
- 2) Adjust pressure and temperature of system to construct the adsorption isotherms, which can be used widely.