CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

CO_2 adsorption on PSAC, CSAC, and PBZ grafted CSAC were studied. The CSAC preferentially adsorbs CO_2 than the PSAC does. It may be due to the difference in the chemical composition of the adsorbents. Methanol is a preferred solvent for the impregnation because the adsorbents using methanol as a solvent have higher CO_2 adsorption capacity than chloroform. The reason may be because chloroform can adsorb on the CSAC and interrupt the adsorption of PBZ. The addition of PBZ does not enhance the CO_2 adsorption capacity of the CSAC at 30 °C. At this temperature, chemical reactions between the amine group and CO_2 are not favorable. On the contrary, the PBZ grafted CSAC shows an improvement in the CO_2 adsorption over the unmodified CSAC at the elevated temperatures. At the elevated temperatures, chemisorption by PBZ plays a more important role than at 30 °C. The CO_2 adsorption capacity depends on the amount of PBZ loading, and the 0.27 wt% loading seems to be an optimum amount. A decrease in the adsorption capacity was found when the CSAC was loaded with 0.92 wt% PBZ or higher because of the pore filling effect. Furthermore, an optimum amount of PBZ loading is needed to increase the CO_2 adsorption capacity. The CO_2 adsorption capacity of the unmodified and modified CSAC can be recovered with minimal loss in the capacity, indicating that the desorption is complete, and the desorption of CO_2 can be achieved at 120 °C.

5.2 Recommendations

Based on what has been discovered in this study, the following recommendation is suggested:

1) Use other shell base activated carbon to get new properties to CO_2 adsorption such as corn cobs, rice husk, and sawdust.

2) Activate the AC with chemicals to get higher surface area.

3) Use other reactants to synthesis benzoxazine monomer to increase more nitrogen containing functional group.

4) Use other solvents for impregnated polymer onto AC such as ethanol or tetrahydrofuran (THF) for improve the solubility of benzoxazine and adsorption capacity.