CHAPTER V
CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

The activated carbon and silica gel were used as the CO_2 adsorbents. The results showed that activated carbon and silica gel beds adsorption capacity enhanced after impregnation with piperazine. Although the limitation of piperazine loading on the activated carbon was 3.45 wt % due to the pore blockage effect in the micropore. This is reflected by the decrease in the surface area of the activated carbon. The adsorption pressure strongly impact CO_2 adsorption capacity of the prepared adsorbents. The piperazine impregnated on activated carbon and silica gel at pressure of 70 psi exhibited the highest CO_2 adsorption capacity of 6.7 mmol/g and 7.7 mmol/g, respectively. The regeneration of the CO_2 loaded adsorbents after three regeneration cycles yielded the efficiency of regeneration of the impregnated activated carbon and impregnated silica gel was more than 85 % and 90 %, respectively. The efficiency was not completely recovered due to the fact that some of the carbon dioxide molecules could still be adsorb to the adsorbent surface.

5.2 RECOMMENDATION

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

It seems to be more appropriate to use mesoporous supports with large pore size and pore volume to impregnate more amines to reduce the pore blockage. This is to suggest by using other mesoporous supports with sizable pore size and considerable pore volume, such as ordered mesoporous silica MCM-41, SBA-15 and carbon nanotube to be the adsorbent for enhancement of CO_2 adsorption capacity.

To exhibit a strong covalent bonding interaction between the acidic CO_2 molecules and the modified basic active sites on the surface facilitates CO_2 adsorption, it is suggested to use amine-grafting method on treated activated carbon

and mesoporous silicas to obtain a covalently tethered amine adsorbent (CTA), such as amine-containing silanes, not only to gain benefits from high surface area adsorbent but the amine-grafting method also contribute to a comparatively higher adsorption rate and higher stability in cyclic runs than amine-impregnated ones.