CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

For methane adsorption, commercial coconut-based activated carbon; A (IN 1100) can adsorb the highest gravimetric amount of methane, following by B (IN 1067), C (IN 1100), D (IN 937), E (IN 1035), F (IN 879), G (IN 987), Co-K_2CO_3/2h, Co-K_2CO_3/1h, and Co-K_2CO_3/3h.

This results indicated that methane adsorption by commercial activated carbon with the higher iodine values (mg/g) led to higher amount of micropore volume of commercial activated carbons which result in higher the capacity of methane adsorbed than that the commercial activated carbons with lower iodine values. However, methane adsorption is not depending only on iodine number, but also depending on the pore size diameter and BET surface of the commercial activated carbons.

The optimum pore size for methane storage is approximately 11.4 Å. Thus, the larger pore size diameter of activated carbons led to less amount of methane adsorption than that the activated carbons with smaller pore size diameter.

Therefore, the physical properties of activated carbons, including BET surface area, micropore volume, total pore volume, and pore size diameter, played an important role in methane adsorption.

From the production of activated carbon, coconut chars yields decreased while burn-off increased due to the hydrogen, oxygen, and volatiles content were removed from the coconut shell at high carbonization temperatures and times.

The results from activation process indicated that BET surface area, micropore volume, and total pore volume of Co-K_2CO_3 were increased at activation time of 60 min up to 120 min and then, BET surface area, micropore volume, and total pore volume were decreased at 180 min due to the pores of activated carbon were collapsed by excess activation time.

The addition of the porous adsorbent such as an activated carbon could increase the capacity of methane storage in the CNG tank.

5.2 Recommendations

To increase the capacity of methane adsorption, the activated carbon helps to increase the surface area by improve pore structure. There are several techniques to achieve high BET surface area such as improve chemical activation process by change the activating agent and heat up the char to higher activation temperature than in this study.