CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This work investigated the hydrogen adsorption of single wall carbon nanotubes, multi wall carbon nanotubes and activated carbon by using constant volumetric technique. A relatively large scale of sample was tested for hydrogen adsorption. The followins are the conclusions made based on the results of this study.

The system was carefully built to prevent the gas leakage. The system was tested with helium gas and the helium leakage is negligible. However, when the hydrogen gas was pressurized into the system, it was found that hydrogen leaked about three to four times larger than helium. Therefore this hydrogen leakage cannot be ignored, particularly if the hydrogen adsorbed by the adsorbent is relatively small, as encounted in this study.

The relatively large amounts of SWNT, MWNT and activated carbon were utilized, and the hydrogen storage capacities of these materials are ranged from 0.2 to 1 wt%, when the initial pressure is 10 MPa.

This work discovered that the ability of SWNT, MWNT and activated carbon to store hydrogen cannot be reached the level for the real applications in fuel cell, that is around 6 wt%.

5.2 Recommendations

The leakage of hydrogen is significant because the amount of adsorbed hydrogen by the studied materials is very small and falls in the same order as the amount of leaking hydrogen. Therefore, for further study, two recommended approaches are given.

The first approach is to keep further on investigation with the modification of carbon nanotubes such as Na or Li doped, or with the new storage materials, such as metal hydride.

The second approach is to improve the apparatus. It is recommended that the apparatus should be re-designed to minimize the leak and should be fabricate as simple as possible. The number of fitting and valves should be minimized. The sample cylinder should be open at only one end. Another pressure transducer with the narrower range of pressure should be installed to enhance the pressure data precision.