



CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The desorption behaviors and desorption temperature of $\text{Mg}(\text{BH}_4)_2$ and $\text{Mg}(\text{BH}_4)_2$ doped with catalysts (Ti, TiO_2 , TiCl_3 , Nb_2O_5 , and NbCl_5) were investigated. The hydrogen desorption profiles of the $\text{Mg}(\text{BH}_4)_2$ showed two-step hydrogen released. The first desorption step occurred at 214 °C, and the second step took place at 374 °C, with the total of 4.78 wt% hydrogen. $\text{Mg}(\text{BH}_4)_2$ doped with 16 wt% catalysts showed good desorption behaviors. That is the second desorption temperature was decreased by 70 °C except for the Ti catalyst. Furthermore, effects of different catalyst amounts (10, 16, and 20 wt%) of TiO_2 and Nb_2O_5 were investigated. The results showed that 16 wt% exhibited the best hydrogen desorption temperature and hydrogen desorption capacity. Hydrogen absorption after desorption of $\text{Mg}(\text{BH}_4)_2$ was also studied under 9.5 MPa and 350 °C for 12 h and the results showed that all samples do not absorb hydrogen at these conditions.

5.2 Recommendations

Recommendations for further hydrogen storage are:

1. The preparation of $\text{Mg}(\text{BH}_4)_2$ in a donor solvent adduct (solvate) should be conducted.
2. Another reactant to synthesize $\text{Mg}(\text{BH}_4)_2$ namely NaBH_4 should be investigated.