CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this research, Li-N-H, the mixture of $LiNH_2$ and LiH, and Li-Al-N-H, the mixture of $LiNH_2$ and $LiAlH_4$, systems were modified by adding metal loading, changing mixing means, and packing sample for hydrogen storage. The results are that the mixing means lead to the change in the crystallinity and the physical properties of the mixtures. Moreover, catalysts provide higher hydrogen storage capacity. Types of metal loading have an effect on the amount of hydrogen desorption/absorption. The mixture of $LiNH_2$ and LiH doped with 1 mol% TiO_2 gives the best result with the hydrogen desorption up to 1.5 wt%, followed by doped with Ni and Fe. However, these mixtures cannot be reversible. For the mixtures of $LiNH_2$ and $LiAlH_4$, they are doped with 1 mol% $ZrCl_4$, TiO_2, and VCl_3. The TiO_2 doping mixture cannot see the increasing of the hydrogen desorption but it shows the higher kinetic desorption rate while the mixtures doped with $ZrCl_4$ and TiO_2 desorb higher hydrogen capacities and increase the kinetic desorption rate. The hydrogen desorptions of doped samples are ranged between 5.0 – 8.6 wt%. The results from different sample loading methods indicate that the contact time of the reaction between ammonia and LiH is one important parameter to improve the hydrogen desorption. Ammonia from $LiNH_2$ should have long enough resident time to react with LiH from $LiAlH_4$. Furthermore, all $LiNH_2$ and $LiAlH_4$ mixtures desorb 0.15 to 0.4 wt% hydrogen for the subsequent cycles.

5.2 Recommendations

A reading pressure value could be expressed with higher resolution by using higher bit of computer processing unit (CPU) in AI module 210 data logger (A/D).

An adequate amount of sample should be used to compensate all possible errors. The sample loading must be carefully performed in order to reduce errors.

The operating condition especially the temperature has an affect on the display pressure. As a result, the adsorption condition should be operated at a constant temperature in order to enhance the pressure precision.