CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The gas phase adiponitrile (ADN) hydrogenation over ceria-zirconia mixed oxide supported nickel ($Ni/Ce_{0.75}Zr_{0.25}O_2$) and ceria-zirconia-magnesia mixed oxide supported nickel catalysts ($Ni/Ce_{0.75}Zr_{0.15}Mg_{0.20}O_2$) under various reaction conditions was investigated at atmospheric pressure. The main product obtained from partial hydrogenation was observed to be 6-aminohexanenitrile (AHN). For $Ni/Ce_{0.75}Zr_{0.25}O_2$ catalyst, increasing both reaction temperature and GHSV resulted in increasing the product selectivity, yet decreasing the conversion of ADN. In contrast, the opposite results were obtained with increasing the H_2/ADN ratio. The incorporation of Mg into the ceria-zirconia support could weaken the support acidity; as a consequence, the $Ni/Ce_{0.75}Zr_{0.15}Mg_{0.20}O_2$ catalyst could provide a less selectivity of AHN to HMI which is the undesired product.

5.2 Recommendations

In the presence work, adiponitrile was partially hydrogenated to 6-aminohexanenitrile (AHN), main product. The route of deeper hydrogenation from AHN should be further investigated. To increase the production of AHN, AHN will be separated from the product mixture and returned the other product to the process.