CHAPTER VI

CONCLUSIONS AND RECOMMEDATIONS

6.1 Conclusions

The conclusions emerged from this research are the following:

1. The presence of vanadium on MgO changes the surface area of V-Mg-O. Low content of vanadium increases the surface area sharply. However, the surface area of V-Mg-O decreases with increasing content of vanadium.

2. Mixed metal oxide catalyst of V-Mg-O is active and selective for oxidative dehydrogenation. Selectivity to propene and activity of catalyst increase with increasing amount of vanadium in V-Mg-O catalyst.

3. The presence of small amount of alkali on V-Mg-O catalyst improves its activity at high temperature (550-600°C).

4. IR spectrum confirms the absence of V=O bond on V-Mg-O surface. Vanadium oxide does not form on surface as a monolayer vanadium oxide catalyst like other vanadium support. It forms with MgO to be new compounds, i.e. $Mg_3V_2O_8$ and $Mg_2V_2O_7$.

5. VO_3 and V-O-V in IR spectrum of V-Mg-O catalyst are likely the most active and selective surface species.

6. The result of thermogravimetric and thermal analysis confirm the existence of water layer on the catalyst surface. The V-Mg-O catalysts begin to be active and selective for ODH reaction after dehydrating at the surface. Heating the catalyst up to a specific temperature (around 350°C) can remove this water layer resulting in the exposure of active sites.

6.2 Recommedations

1. It will be interesting to further study the cause of the disappearance of peak around 1120 cm^{-1} belonging to IR spectra of MgO in the spent catalyst. The peak disappearance may be due to some kind of interaction of the reactive oxygen specie in the ODH reaction. The V-Mg-O catalysts should be characterized by other higher efficiency techniques.

2. It will be interesting to study the effect of vanadium oxides on other supported materials on the activity of VO_3 and V-O-V which may lead to the improvement of catalyst activity.

3 The experiment should be continued by varying the amount of alkali doping to find the optimum content which give the best yield of propene.