CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The conclusions of this research are the following:

1. The incorporation of each cation (Si,Ti and V) into the MFI structure is in random form. During the synthesis procedure, the vanadium species existing in the part of cation complex when it dissolved in aqueous solution is easier to be incorporated into the TS-1 structure than the ones exist in the part of anion complex.

2. The surface area of the synthesized V/TS-1 catalysts decreases when the amount of vanadium incorporated increase.

3. The vanadium salt addition method and the type of vanadium salt do not significantly affect the MFI structure as well as the reaction pathway.

4. The synthesized catalysts have two different types of acid site; the weaker one desorbs NH_3 at the temperature range 135-145°C and the stronger one desorbs NH_3 at around 222-242°C.

5. The catalysts which contain vanadium active species derived from VCl_3 bonded on its surface are active in the 2-propanol oxidation and it can inhibit the dehydration and the combustion of 2-propanol.

6. The catalysts which contain vanadium active species derived from $VO(acac)_2$ bonded on its surface do not be active in the 2-propanol oxidation but it can inhibit the 2-propanol combustion.

7. V_2O_5 is not the suitable vanadium source because V^{5+} tends to stay in the anion complex which is more difficult to be incorporated into the TS-1 structure. Therefore, the synthesized catalysts have small amount of incorporated vanadium.

5.2 Recommendations for future studies

From the previous conclusions, the following recommendations for futures studies are proposed.

1. Because there are many synthesis parameters influence on the properties of the catalyst synthesized by incorporation technique, therefore the other synthesis parameters (e.g. the pH during the synthesis procedure, the interference from the anion and the calcination temperature) should be further investigated.

2. Owing to the used catalysts have different physical property (i.e. the color); comparing with the fresh catalysts, therefore the catalyst deactivation must be further study to investigate the formation of coke on the catalyst surface.

3. Since the TS-1 catalyst is used in the hydroxylation of benzene to phenol, therefore the synthesized catalysts should be test in this reaction to investigate its catalytic activity.