

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The combination of a gaseous plasma environment produced by corona discharge and a Cu/ZnO catalyst in a packed bed reactor gave a feasibility of methane conversion at atmospheric pressure and temperature which is very preferable for the economical point of view. The results obtained during the experiment can be concluded as follows:

5.1 This system is not perfectly suitable for methanol production but the other useful chemicals such as synthesis gas can be significantly produced at atmospheric conditions.

5.2 Oxygen plays an important role on both methane conversion and products selectivities. As increasing the oxygen partial pressure, methane conversion increases but desired product selectivities decrease significantly.

5.3 An increase in the applied voltage yields improvement of methane conversion, but saturation of methane conversion occurs when the applied voltage is beyond 6,000 V which results from an oxygen limitation.

5.4 The longer the reaction time results in the better desired product selectivities.

5.5 Reaction without using the catalyst prefers to produce C₂ hydrocarbons, ethane, ethylene and acetylene.

5.2 Recommendations

Other types of catalysts still have to be employed to selectively convert methane molecule in a gaseous plasma environment. The source of the

power supply to generate the gaseous plasma is an interesting parameter to be investigated such as the frequency of an alternating current. The degree of over oxidation is another important criteria in order to choose the proper active site and support for a methanol production catalyst.