CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this work was to investigate the ethylene epoxidation performance using a parallel plate dielectric barrier discharge (DBD) system by initially producing oxygen active species prior to reacting with ethylene. The effects of various operating parameters, including ethylene feed position, oxygen-to-ethylene feed molar ratio, Ag/SiO_2 catalyst existence, applied voltage, input frequency, and feed flow rate on the ethylene epoxidation activity were examined. It was found that the highest EO selectivity of 72 % was obtained when the DBD was operated at an ethylene feed position fraction of 0.5, an O_2/C_2H_4 feed molar ratio of 0.2:1, the presence of Ag loading of 10 %, an applied voltage of 19 kV, an input frequency of 500 Hz, and a total feed flow rate of 50 cm^3/min. At these optimum conditions, the power consumptions to break down each C_2H_4 molecule and to create an EO molecule were found to be 22.9×10^{-16} Ws/molecule of C_2H_4 converted and 16.56×10^{-16} Ws/molecule of EO produced.

5.2 Recommendations

The optimum conditions for ethylene epoxidation under the parallel plate dielectric barrier discharge system should be increasing the frequently of ethylene feed position fraction in order to further enhance the epoxidation performance.