CHAPTER V
CONCLUSIONS

Octadecyltrichlorosilane (ODS) was chemically bonded onto silica surface to improve the ozonation efficiency of trichloroethylene (TCE). The synthesized catalyst was characterized by FTIR and elemental analyzer. The absorption band of ODS due to the alkyl group attributed to the octadecylsilyl group appeared. The various amounts of ODS were varied to find the maximum coverage of ODS bonded onto silica surface. The percentage of carbon from elemental analysis was corresponded to the maximum coverage of ODS on silica which equaled 425.74 μmole/g of treated silica.

The effectiveness of catalyst was also studied. The result showed that the catalyst could greatly improve the oxidation efficiency. From the adsolubilization experiment, the relationship between TCE in aqueous solution and in admicelles was found to be the straight line.

The external limitation was tested by varying the stirring speed from 550, 750, 900 and 1,000 rpm. The result showed that the external limitation was negligible when the stirring speed was higher than 900 rpm.

Kinetic study was performed in the semibatch reactor at the ozone concentration 100 g/m^3, flow rate 50 ml/min, temperature 20°C and catalyst weight 25 g. The reaction rate equation was found to be first order with respect to TCE concentration over the entire range of this study. The overall apparent pseudo first order reaction rate was 0.002 $(g.min)^{-1}$.

As the admicellar catalyst can improve the ozonation efficiency by increasing interaction between the contaminant and the ozone, it is of interest to

improve its efficiency by increasing the amount of the contaminants in admicelles. This can be performed either by increasing the chain length of surfactant like molecule or forming the multilayer bonded on silica from the monolayer bonded. Another interesting study is to improve the ozonation resistance of the catalyst by changing to the other surfactant like molecule such as fluorocarbon type.