CHAPTER VI

CONCLUSIONS

The following conclusions may be drawn from the present work.

1. Catalysts used for comparative study of conversion of alcohols (C_1^{OH}-C_4^{OH}) to light olefins are mordenite (HM-10) and Y-type zeolite (HY-5.6). The catalyst were obtained from Professor Niiyama's catalytic research laboratory, Tokyo Institute of Technology The catalyst (mordenite) was made as follows :

a) The fine powder crystal catalyst was weighted and then compressed to obtain a pellet. The pellet was next cut up and screened to select fragment of size between 20-40 mesh.

b) The catalyst was calcined for 1 hour in calcinator in atmospheric air at approximately 450°C.

c) Then, the catalyst fragments were packed into the reactor for use in the above reaction experiments.

The same procedures (step a.-c.) were carried out zeolite.

2. Comparative study of conversion of alcohols (C_1^{OH}-C_4^{OH}) to light olefins were made. The experiments were carried out using methanol, ethanol, n-propanol, and n-butanol respectively, the temperature was varied from 200 to 350°C, the space velocity from 1500 to 5000 hr^{-1}.

Analysis of the products were performed using gas chromatograph (Shimadzu Model GC-9APF)

3. From the experimental results obtained in this study, it may be concluded that the effects of alcohols, temperature, space velocity, and influence of type of zeolite on the reaction process were as follows.

3.1 The straight-chain alcohols used for reactivity study were MeOH,EtOH,n-PrOH, and n-BuOH. From the patterns of reactivity it has been found that the conversion of alcohol to light olefins increase with chain length. The longest straight chain alcohol, n-Butanol is the most reactive alcohol.

3.2 Alcohol conversions (C_1^{OH} to C_4^{OH} conversion) generally increases with increasing temperature between 200 to 350°C, which are the same for both catalysts. Yield of light olefins increases with increasing temperature in the case of HM-10 and HY-5.6.

3.3 For HM-10 zeolite, alcohol conversion decreases with increasing space velocity between 1500 to 5000 hr^{-1} in case of methanol, ethanol, n-propanol, and n-butanol. Yield of light olefins generally increases with decreasing space velocity. The conversion of alcohols (C_1^{OH}-C_4^{OH}) and yield of light olefins profiles showed the same patterns in case of HY-5.6 zeolite.

3.4 Of the two studied catalysts, HM-10 zeolite has higher activity than HY-5.6 zeolite. Therefore HM-10 is suitable for conversion of alcohols to light olefins.

RECOMMENDATION

As the next step of study, it should be studied on the effect of cation-exchange from alkali metal (Li, Na, K, Rb) on mordenite catatyst or Y-type Zeolite for conversion of alcohols (C_1OH - C_4OH) to light olefins. Once the best catalyst has been found , then more study on the physical properties of Zeolite has effect ed on conversion of alcohols to light olefins and it should continue to study on the effect of type of reactor (fluidized bed reactor) on product distribution for conversion of alcohols (C_1OH - C_4OH) to light olefins process.