# CHAPTER FOUR

## CONCLUSIONS

On the basis of the experimental data obtaind we can conclude that:

* The most active catalyst for toluene conversion is the H-ZSM-5 zeolite dealuminated with HCl for 4h, evidently due to increasing the acid sites strength although the acid sites number has decreased.

* The most active catalyst to produce total xylenes is the H-ZSM-5 zeolite dealuminated for 4h followed by siliconiization. At 550°C and space velocity of 1 g $g^{-1}h^{-1}$ 19.8 mol% total xylenes are obtained.

* The most selective catalyst for p-xylene production is the siliconized H-ZSM-5 especially at 550°C (selectivity = 46.65%). Incorporation of Si in the zeolitic channels should have decreased their diameter and hence increased the p-xylene selectivity.

* The most active catalyst for benzene production is dealuminated H-ZSM-5 (4h) catalyst which give a yield of 56.67 mol% at 600 °C and S.V.= 1 g $g^{-1}h^{-1}$. This catalyst is the most strongly acidic, whereby dealkylation of toluene is accelerated and also, disproportionation is enhanced.

* The activity and selectivity of H-ZSM-5 greatly exceeds that of H-MOR due to the smaller pore diameter of H-ZSM-5 and its relatively lower acidity which delays the backward cracking of formed xylenes.

* In general, addition of the silicon material decreases the activity of the catalyst but increases the selectivity for p-xylene.

* The rate of coke formation at H-MOR is higher than that at H-ZSM-5 because of the higher acidity of the former zeolite. This rate is decreases on addition of silicon because of decreasing the acid strength of the zeolite.