CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

C_8 aromatics adsorption in the presence of toluene on NaY, KY, BaX, and BaY zeolites was studied. The headspace gas chromatography or headspace technique was used to study the adsorption in the temperature range of 40 °C - 120 °C and 1.25 wt% - 20 wt% *p*-xylene initial concentrations. Moreover, the experiment was also done by using the batch method to investigate the applicability of using headspace chromatography. For the headspace technique, the results showed that KY zeolite had highest *p*-xylene selectivity followed by BaX, BaY, and NaY zeolites due to the acid-base interaction between the adsorbent and adsorbate. This is true for all studied conditions. It was found that toluene affected the adsorption information, which showed that NaY zeolite selectively adsorbed *p*-xylene instead of *m*-xylene, and the adsorbed amount increased when the temperature increased. When the results from the headspace technique were compared with the results from the batch method, they showed the same trend for the effects of zeolite. That is KY zeolite had the highest *p*-xylene selectivity followed by BaX, BaY, and NaY zeolites. Moreover, the *p*-xylene selectivity from the headspace technique was lower than that from the batch method. However, the headspace technique can be used to study the C_8 aromatics competitive adsorption without the presence of toluene.

Recommendations

1. The experiment should be done on the system without toluene at the lower amount of mixture on the zeolites to study the effects of the adsorbate/adsorbent ratios.
2. The binary adsorption of *p*-xylene and other C_8 aromatics or the quaternary adsorption of C_8 aromatics is of interest.