

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The adsorption isotherms of all five cationic surfactants on MCM-41 and Hi-Sil 255 were experimental found to be L-shaped which exhibited the regions II, III and IV. Region I could not be visible as a result of the strong electrostatic attraction between the positive surfactant molecules and the negatively charged surfaces of both materials. The octyltrimethylammonium bromide adsorption isotherms on MCM-41 and Hi-Sil 255 g had the maximum adsorption densities of 4.91 and 2.98 molecule/nm², respectively. The cetyltrimethylammonium bromide adsorption isotherm on MCM-41 and Hi-Sil 255 exhibited the minimum adsorption densities with the values of 4.19 and 2.55 molecule/nm², respectively. The area per head group of octyltrimethylammonium bromide was 20 Å²/molecule and of cetyltrimethylammonium bromide was 39 Å²/molecule for MCM-41.

For the effect of the surfactant tail length on adsorption on MCM-41 and Hi-Sil 255, it has been found that when the number of carbon atoms in the surfactant tail was increased, the adsorption densities on both solid substrates decreased significantly. This is due to as the effect of the tail length that causes other surfactant monomers hardly enter and to be adsorbed inside the pores of the solid substrates. Octyltrimethylammonium bromide which has the shortest tail length (8.8Å) could enter and be adsorbed on the surface and inside the pores of MCM-41 and Hi-Sil 255 with the highest value of 8200 and 840 μmol, respectively. In contrast, cetyltrimethylammonium bromide which has

the longest tail length (17.6 Å) could enter and be adsorbed the least with the values of 7000 and 700 μmol , respectively.

5.2 Recommendations

For the future work, one should take the different pore size distribution of MCM-41 to study the adsorption of the surfactants with the different chain length inside those pores, change conditions that may relate to the adsorption capability and it should study other variables such as temperature and pH that affect the adsorption isotherm on MCM-41.