



CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The adsorption of block copolymers onto hydrophilic silica occurs for those tested copolymers which fall into the HLB range of 7-18. Block copolymers with HLB values lower than 7 do not appreciably adsorb due to the small number of EO groups capable of interacting with the silica surface, and block copolymers with HLB values higher than 18 do not adsorb well onto silica neither due to their high affinity for the aqueous phase. The adsorption isotherm of block copolymers is Langmurian in shape, increasing without apparent breaks until it reaches a plateau. Four factors are considered for the adsorption of block copolymers onto silica; HLB value, configuration, EO/PO ratio, and molecular weight. Consequently, the maximum amount of adsorbed surfactant is thus affected by the copolymer configuration, EO/PO ratio, and molecular weight as well.

Block copolymer surfactants appear to have higher adsolubilization capacities (adsolubilized solute / adsorbed surfactant) for aromatic compounds, especially with small organic molecules or polar substances, than do the adsorbed layers of other conventional surfactants. The affinity of phenol, 2-naphthol, and naphthalene to be adsolubilized onto the adsorbed layers of copolymer surfactants is influenced by the number of PPO groups and the molecular weights of the copolymers themselves. For a given HLB value, the copolymers which have a larger number of PPO groups and higher molecular weight appear to appreciably adsolubilize organics more than those with a lower number of PPO groups and lower molecular weight. Moreover, the organic size has an enormous effect on the amounts of adsolubilized organics. The small molecules prefer to be adsolubilized more than the larger one because they are easily adsorbed onto the adsorbed layers of copolymer surfactants. The difference in polarities also seem to be a factor, the polar compounds tend to have significantly higher in the amounts of organics adsolubilized than the non-polar compounds.

For surface characterizations, the modified silica with various types of block copolymer surfactants, appear to have clusters of copolymers cover on the sil-

ica surfaces. However, the cluster phase heights tend to be flatter after the organics adsolubilization.

5.2 Recommendations

This research has emphasized the fundamental characteristics of the adsorption of silica modified with various types of block copolymer surfactants, in order to study the organic adsolubilization. The results illustrate that Pluronics L64 performs the satisfactory adsorption and adsolubilization behaviors. Therefore, further study should be applied in the practical conditions. The examination of changes in pH, additives, or temperatures should also be considered.