CHAPTER IX
CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

In this study, temperature effect on adsolubilization and nature molecular interactions (or microenvironment) in admicelles were elucidate. It is found that preferential loci of hydrophobic and hydrophilic solutes are admicellar core and palisade/headgroup regions, respectively. The partition coefficient is affected by temperature increasing in three primary ways, (1) increasing aqueous solubility of solute (2) loosening of surfactant packing in admicelle and (3) attractive interaction between solute and surfactant molecules. Between cationic admicelle and aromatic solute, such interaction includes hydrophobic, cation-π and dipole-dipole forces. They intensively controls 2-D structure of admicelles, normally flatten the admicelles. Highly hydrophobic solutes prefer partitioning into the admicelle in high region II of surfactant adsorption than that in region III. At same temperature, preferential surfactant adsorption region for partitioning of highly hydrophilic solute would be both region II and region III depending on the solute mole fraction in admicelles. DSC shows 3 loci of micellar solubilization, whereas, it cannot distinguish the sharp difference between each loci in admicelle possibly due to uniform packing density in admicelle although the composition and hydrophobicity of microenvironment in admicelle are different. Based on this knowledge, simple thermodynamic model of adsolubilization is developed. However, it is valid only for solute with simple molecular structure and surfactant aggregates with low degree of water penetration.

9.2 Recommendations

- Although, DSC analysis can provide a possible number of loci of solubilization in surfactant aggregates distinguished by phase transition point of solute in surfactant aggregates; it still can not define exact loci.

NMR technique should be used to analyze and confirm the microenvironment of the solute in surfactant aggregates.

- Although molecular interactions between solute and surfactant in admicelle is a main factor to control 2-D structure of admicelles, molecular volume of solute, which have been controlled as constant in this thesis, would be additionally studied.
- Degree of water penetration in surfactant aggregates is a main factor in controlling partition of solute in surfactant aggregates; however, this factor is fixed in our latest thermodynamic model of solubilization shown in this thesis. The new contribution of free energy change of solubilization should be developed to make this model more general.
- Differences between adsolubilization of *charged* solute at various surfactant adsorption regions would be interesting to be additionally investigated because the electrostatic interaction between solute and surfactant headgroup will be significant for transferring such *charged* solute molecule from aqueous phase to admicellar phase.