

CHAPTER V

CONCLUSIONS AND RECOMENDATIONS

5.1 Conclusions

In this work, the adsorption isotherms of surfactants on three types of hydrophobic surfaces were investigated and correlated to the contact angle of surfactant solution on those surfaces. The surfactant used are linear alcohol ethoxylates (EO5, EO7, EO8, and EO9), methyl ester sulfonate (MES), and nonylphenol ethoxylate 9 (NPE-9) and the plastic used in both adsorption and contact angle study are Poly(tetrafluoroethylene) (PTFE), Poly(vinyl Chloride) (PVC), and Poly(methyl methacrylate) (PMMA).

From the experimental results, the conclusion can be drawn as following:

Adsorption and Wetting of AEs

1. At the below its CMC region, the adsorption of each AE slightly increases with increasing equilibrium concentration of corresponding surfactant and levels off to the plateau at around the CMC region. In addition, the amount of AE adsorbed decreases as the number of ethylene oxide units in the AE molecule increases.

2. The contact angle decreases significantly with increasing AE concentration and become nearly constant above the CMC. In addition, the wettability of AEs on each surface increases with decreasing the number of POE group.

3. The adsorption and wettability of AEs increases with increasing hydrophilicity of the surface.

4. Increase in surfactant concentration not only decreases γ_{LV} but also decreases γ_{SL} . According to the adhesion tension plots of pure AEs solution, the plots indicate that the Γ_{LV} is higher than Γ_{SL} .

5. For the effect of hydrophobicity of surface, surfactant can adsorb at solid/liquid interface at lower hydrophobic surface better than at higher hydrophobic surface.

Adsorption and Wetting of NPE-9 and MES

1. At the below its CMC region, the adsorption of NPE-9 and MES slightly increase with increasing equilibrium concentration of corresponding surfactant and levels off to the plateau at around the CMC region.

2. The contact angle decreases significantly with increasing NPE-9 and MES concentration and become nearly constant above the CMC.

3. The adsorption and wettability of NPE-9 and MES increase with increasing hydrophilicity of the surface.

4. Increase in surfactant concentration not only decreases γ_{LV} but also decreases γ_{SL} . According to the adhesion tension plots of pure NPE-9 and MES solution, the plots indicate that the Γ_{LV} is higher than Γ_{SL} .

5. For the effect of hydrophobicity of surface, surfactant can adsorb at solid/liquid interface at lower hydrophobic surface better than at higher hydrophobic surface.

5.2 Recommendations

1. The effect of pH is recommended for further study. The range of pH should cover a point of zero charge (PZC) of the polar plastics.

2. The effect of mixed surfactant on wettability should be studied by using the mixture of anionic/nonionic in various ratios.