CHAPTER IV

CONCLUSION AND SUGGESTION

4.1 Conclusion

The utilization of the four groups of ethoxylate surfactants, conventional anionic (nonylphenol ethoxylate sulfate), conventional nonionic (nonylphenol ethoxylate), green anionic (fatty alcohol ethoxylate sulfate), and green nonionic (fatty alcohol ethoxylate), in emulsion copolymerization of methyl methacrylate-butyl acrylate was studied. The parameters varied in research were the surfactant concentration (0.25% - 1.05%), and the degree of ethoxylation of the surfactants (EO number of 4 – 40). Nonionic surfactants, both conventional nonylphenol and green fatty alcohol surfactants were not suitable for this polymerization system. Nonionic surfactants with low degree of ethoxylation could not provide a stable monomer pre-emulsion. Although the nonionic surfactants with longer ethoxylate chain could provide a stable monomer pre-emulsion, the latices obtained from the polymerization using these surfactants were unstable upon storage. The extensive study on the emulsion polymerization and the properties of the latex products was thus carried out with only the anionic surfactants. The study found that, within an appropriate concentration range, increasing in the concentration of the surfactants could reduce the latex particle size, improve storage stability of the latex and water resistance of the dry films. The electrolyte stability however slightly decrease with the increasing surfactant concentration. Too much and too little surfactants caused the latex to have poor freeze-thaw stability. Increasing in degree of ethoxylation of the surfactants without increasing w/w concentration used resulted in larger latex particle size and hence reducing the storage stability. Freeze-thaw stability, and electrolyte stability of the latex, and water resistance of the dry films were independent to the degree of ethoxylation of the surfactants. The molecular weight, minimum film forming temperature (MFFT) of the latex and gloss of the dry film were independent on both of degree of ethoxylation and concentration of the surfactants.

In conclusion, the fatty alcohol ethoxylate sulfate surfactants may be used inplaced of the conventional nonylphenol ethoxylate sulfate surfactants for the emulsion polymerization of methyl methacrylate-butyl acrylate copolymer.

4.2 Suggestion for future work

This research studied the effect of ethoxylate surfactants in emulsion polymerization. The particle sizes of the latex products obtained in this study are in the 110 – 700 nm range by varying the types and concentration of the surfactant. It should be interesting if the latex particle size can be reduced to less than 100 nm by further adjustment of the concentration ratio between the monomers and the surfactants. The properties of the latex products containing the particle with sizes less than 100 nm should provide interesting properties and applications in the field of nanotechnology.