

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Colloidal flocculation and stabilization of monodisperse silica particle has been controlled by the adsorption of polymer or surfactant which depends on the concentration of the adsorbed molecules. Polymer (polyacrylamide) at high and low molecular weight were expected to control the particle growth, but the experiment showed that the effect of viscosity and shear rate were more important.

The surfactant (CTAB) adsorption is more effective on controlling the particle size than the polymer adsorption. Maximum flocculation was obtained at 100 ppm CTAB concentration. The surface charge at this point was equal to zero so that charge neutralization induced the flocculation. The adsorption data indicated that surfactant-induced flocculation involved complex phenomena which no one can explain clearly until now. The redispersion had been done and it was found that CTAB could be used for dispersion purpose and the redispersion size was really dependent on the shear rate. The higher the shear rate, the smaller the floc size was. From this experiment, the shear rate about 1500 1/s could break the floc size to 600 nm.

RECOMMENDATIONS

- **Shear rate** : Shear rate is very important in controlling the stability of the system. The correlation of particle growth at any conditions e.g. vary the salt concentration, using any other kind of colloidal particles to study instead of using silica particles. The equipment for controlling the shear rate of the solution is Rheometer.

- **Chain length of surfactant** : Find the relationship between the Chain length and the growth of floc size.

- The surfactant in this experiment is cationic surfactant. It should have some data from nonionic or anionic surfactant to see the different in mechanism of particle growth and also develop the model for controlling floc size.

- **Effect of pH** : Effect of pH at different salt concentration was found to have an important role. The future studies should be emphasis on the effect of pH for controlling the floc size.

- **Kinetic study** : It's rather complicated to develop the rate of reaction because this system is concerned about the fast aggregation. Shear rate and the floc may not be the spherical shape.

- **Coulter Counter** : Coulter Counter analyzes the result better than Light Scattering in this case. Since the floc size is big, the floc will settle down to the bottom of the sample cells. Using DLS to analyze the sample, the result can be inaccurate. On the other hand, Coulter Counter has a mechanism to mix the sample all the time. Therefore, the result will be more accurate. The disadvantage of Coulter counter is that it can be used to analyze the particle size started from 0.4 micron or 400 nm so it cannot be used for the particles which is smaller than 400 nm.

- **Solvent** : Change the solvent or change the system such as use oil-water system or use alcohol instead of water.
- **Adsorption Isotherm** : Investigate more about electrolyte concentration which affects the adsorption isotherm.