CHAPTER VI

CONCLUSION

6.1 CONCLUSION

1. This investigation shows that the dissolution rate coefficient of styrene-butadiene in mineral oil in agitated vessel can be correlated by the following dimensionless equation. ,

For disc turbine

$$Sh_T = r\ Re_a^{1.35}\ Sc^{3.20} \qquad 2.5685\text{x}10^3 < Re_a < 8.3864\text{x}10^3$$

$$3.2091\text{x}10^9 < Sc < 11.3330\text{x}10^9$$

For Paddle

$$Sh_T = r\ Re_a^{0.57}\ Sc^{2.22} \qquad 2.5685\text{x}10^3 < Re_a < 8.3864\text{x}10^3$$

$$1.0002\text{x}10^{10} < Sc < 3.7200\text{x}10^{10}$$

The constant r depends on solid-liquid system.(as shown in Table 5.15) Although r in each system is different, but the exponent of the Reynolds number and Schmidt number are the same for every system for similar impeller type. The constant r in the dimensionless equation depends on the solid-liquid system,solid concentration, impeller types, mixing condition and the characteristics of liquid solution.

2. On comparing the dissolution constant of the standard six blade disc turbine and paddle impeller, we observed that for the same impeller size studied at the same Reynolds number, the standard six blade disc turbine gave higher value for the dissolution constant, K, than the paddle impeller.

3. The results obtained can be used in the designing of blending tank for lubricating oil. At the same time the results obtained are important in contributing to the deeper understanding of the influence of mixing condition of the system.

4. The exponents of the Reynolds number and of the Schmidt number in Figure 5.17 showed the dependency of mass transfer on the speed of agitation and the temperature of the system

5. The results of this work are shown in Figures 5.18 and 5.19. The results are differance from other investigators because the agitating system, the solid-liquid system used and the experimental condition are not the same, although we did not proposed any theory or used the theories of mass transfer as proposed by past researchers, our result did not differ much from the others, and showed the some trend of dependency on the speed of agitation and the temperature of the system. There fore, it can be concluded that there is no general correlation for the solid-liquid dissolution.

6.2 RECOMMENDATIONS FOR FUTURE WORK

Since, the correlation varies from case to case and there is no general correlation for the dissolution of solid. The variation of dissolution rate coefficient could have resulted not only from the Reynolds number, Schmidt number, impeller type and solid concentration of the liquid system but also from other factors such as solid-liquid system, diameter of the solid particles, level of agitation, shape of particles, density difference between solid and liquid system, ratio of turbine diameter to tank diameter, diffusivity, viscocity etc. The results above suggests that to arrive at a more generalized equation of solid-liquid dissolution, further studies should be carried out, such as determination of the influence of other factors mentioned, the mixing time and the power consumption.