

CHAPTER V

CONCLUSIONS

The precipitation of barium chromate from the retentate, mixture of chromate anion (CrO_4^{2-}) and a water soluble cationic polyelectrolyte, from Polyelectrolyte-Enhanced Ultrafiltration (PEUF) process was studied to recover the cationic polyelectrolyte. This polyelectrolyte was poly (diallyldimethyl ammonium chloride) at the concentrations of 0, 0.2, 0.3, and 0.4 M. The crystallizer used to precipitate barium chromate was a jacketed glass column with temperature controlled at 30 °C by circulating water from a temperature-controlled bath. The chromate ions, solid precipitate and polyelectrolyte concentrations leaving the crystallizer outlet were studied as a function of outlet height, feed flow rate, and barium to chromate concentration ratio. In the presence of QUAT, the precipitation of barium chromate formation reached the equilibrium after 0.5 hour. It was found that 99% chromate was removed when the ratio of barium to chromate was up to 2, particularly at high QUAT concentration. Both semi-batch and continuous processes gave similar results for chromate ion concentration and QUAT concentration, but the continuous process gave lower %chromate in BaCrO_4 particle than that of the semi-batch process. It was found that increase in flow rate resulted in the increase of QUAT concentration and chromate in the BaCrO_4 particles. Furthermore, increase in crystallizer height resulted in the decrease of chromate in the BaCrO_4 particles. Also increase in barium to chromate concentration ratio greater than 1 presented insignificant decrease in chromate concentration in the overflow solution.

The semi-batch process shows unchange of barium chromate particle at the crystallizer outlet when the crystallizer height increases, while, the continuous process shows no effect of crystallizer height above 53 cm. Furthermore more barium excess is not necessary for barium chromate precipitation because it might be useless barium after the concentration of chromate was constant at the ratio of 2 in continuous process and remained decrease of $\%CrO_4^{2-}$ to the ratio of 2.5 in semi-batch process.