

CHAPTER V

CONCLUSIONS

Polyelectrolyte-enhanced ultrafiltration (PEUF) of chromate–sulfate mixture can be operated at ambient temperature and relatively low pressure. The rejections of chromate tend to decrease when poly(diallyldimethyl ammonium chloride) or QUAT concentrations are higher than 100 mM. The high QUAT concentrations in retentate caused decrease in the chromate rejection due to the increase in concentration polarization near the membrane surface. The lower the concentration ratios of QUAT to total anions, the higher reduction in chromate rejection.

Relative flux declines when the concentration of QUAT in retentate increased due to the gel formation over the surface of an ultrafiltration membrane. This is the concentration polarization behavior which generally occurs in ultrafiltration process. However, the concentration polarization is not a severe problem in PEUF if the polyelectrolyte concentration of retentate is much lower than the gel concentration.

Equilibrium precipitation of barium chromate and barium sulfate from simulated retentate of PEUF process was studied to recover QUAT. When barium(II) ion or the concentration ratios of barium to anions (chromate and/or sulfate anions) are increased, the higher fraction of chromate precipitates. The higher QUAT concentration, the more difficult to precipitate barium chromate and barium sulfate than the lower QUAT concentration due to positively charged site of polymer bound with chromate and sulfate anions.