

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

Addition of surfactant in nanofiltration membrane has become the key property in this study. Experimental data shows the addition of SDS as anionic surfactant gives PWP of about 308.12 L/m²h at 5 bar operating pressure and at 21wt% of polymer solution. Besides, addition of CTAB as cationic surfactant has shown promising result with increased the PWP up to 1370.33 L/m²h at the same operating pressure. In terms of permeation flux and rejection towards dye, membrane with CTAB shows capable result where permeation flux of about 8.972 L/m²h and rejection almost 100% of about 99.9%. This indicates CTAB was suitable surfactant addition in removing dye with high retention of dye.

Moreover, addition of CTAB in the polymer solution also makes the prepared membrane highly porous in structure. Addition of CTAB in polymer solution also has suppressed the macrovoids in the membrane sub-layer allowing the formation of long finger-like structure across the membrane sub-layer. long finger-like structure gives

advantage on the facilitation of solution throughout the membrane. Between SDS and CTAB, CTAB effective as surfactant addition in improve the nanofiltration membrane performance. With high rejection on dye removal, addition of CTAB promise better separation process for textile industry in Malaysia.

Thus, based on experimental data and membrane characterization, the aim of this study has reached the target since the fabrication of asymmetric nanofiltration-surfactant (NFS) membrane were fully developed with successfulness on examination and evaluation the major effects of hydrophilic surfactant towards membrane performance, structural property and dyes removal.

5.2 Recommendation

Based on the membrane performance-properties and characterization, there are several recommendations should be implemented for the improvement and further development regarding this project. The suggested recommendations are:

1. Prepared membranes can undergo further analysis using AFM, NMR and XRD for continuous characterizations.
2. Instead of 3 types of dye solution used, addition of another dyes solutions can be used in order to determine which dyes solution can NFS remove effectively.
3. Expand the scope of the study with addition of parameters such as COD and BOD analysis as well as pH for wastewater treatment.
4. Analysing the real sample of dyes from real wastewater effluent from different textile industry in Malaysia.