CHAPTER V

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

From this study, newly polymer-surfactant dope for LPROS membrane were develop and fabricated via phase inversion process. The major effects of hydrophilic surfactant on the performance of LPROS membrane were examined, and characterized using SEM, FTIR and TGA analysis. Form the first part, which was the comparison between polymer concentrations used for this study, it can be concluded that membrane with low polymer concentration, 21 % of PSF which was membrane PSP1 produced higher saline water flux and salt rejection as compared to membrane PSP3 which gave value of 26.79 L/m^{2}h (flux) and 87.25 % (salt rejection).

Then, it was followed by the best performance of membrane PSP1-C2 in comparison with other surfactant used which were Triton X-100 and SDS. It can be said that CTAB gave highest improvement in membrane performance which gave value of 29.19 L/m^{2}h (saline water flux) and 94.08 % (salt rejection), as well as good morphology, physico-chemical and thermal stable as compared to Triton X-100 and SDS.

In terms of surfactant concentrations, for all three surfactant type which are CTAB, Triton X-100 and SDS, at 2 wt. %, which were the membrane PSP1-C2, PSP1-T2, and PSP1-S2, obtained the highest salt rejection as compared to other surfactant concentration. On the other hand, for saline water flux, the result obtained depend on the type of surfactant. For CTAB, 3 wt. % was the best concentration which was membrane PSP1-C3 achieved the highest flux, meanwhile for Triton X-100 and SDS, 2.5 wt. % was the best concentration which were membrane PSP1-T2.5 and membrane PSP1-S2.5. However, 2 wt. % of surfactant was considered the optimum concentration as it produced high salt rejection and intermediate saline water flux. In the desalination industry, membrane that produced high salt rejection was highly preferably. As the conclusion, by comparing all membranes, membrane PSP1-C2 is the best membrane to be used in saline water desalination, supported by the high porosity structural morphology, and good thermal stability.

5.2 Recommendations for Further Study

There are few recommendations that can be considered in order to improve the results of this study for future research, as below:

i) In terms of water desalination, further study should be done by using real samples collected from the seawater and brackish water, to investigate the effectiveness of LPRO membrane in real desalination process.

ii) Different characterization techniques should be employed for further characterization of LPRO membranes such as Atomic Force Microscopy (AFM) to analyze the surface morphology and roughness of membrane.

iii) The study of flat sheet LPRO should be extended to hollow fiber membrane in order to achieve high performance membrane separation process to be used in large scale of water desalination.

iv) Response Surface Methodology (RSM) should be employed to optimize the parameters of the research.