

CHAPTER V

CONCLUSIONS

The composite membranes were prepared by incorporation of SPPO and zeolite Y to form a proton exchange membrane (PEM) for Direct Methanol Fuel cell (DMFC). In the first step, SPPO was prepared with different degrees of sulfonation. The properties of the SPPO membranes depend on DS; a higher DS value tends to increase water uptake and IEC. Subsequently, the SPPO membrane at the highest DS was selected to fabricate the composite membrane with zeolite Y at different contents (0.1, 0.5, 1, and 2 %v/v). The composite membranes reveal the highest proton conductivity value of 7.34×10^{-3} S/cm, and the lowest methanol permeability value of 1.01×10^{-7} cm²/s. The membrane selectivity of the SPPO/zeolite Y composite membrane is comparable to that of Nafion 117 membrane in term of membrane selectivity. A SPPO/zeolite Y composite membrane with 0.1 %v/v of zeolite Y shows the highest membrane selectivity of 6.02×10^4 S.s/cm³, which is higher than that of Nafion 117 of 4.20×10^4 S.s/cm³. Hence, this work demonstrates the potential of these composites to serve as PEM with smaller methanol permeability for DMFC.