CHAPTER V
CONCLUSIONS

4,4'-diaminodiphenylmethane-2,2'-disulfonic acid was synthesized as monomer. Sulfonated copolyimides with different degrees of sulfonation were synthesized. The structure of SDDM was characterized by ^{1}H-NMR. The chemical structure of unsulfonated and sulfonated copolyimides was confirmed by FTIR. The functional groups of imide carbonyl, imide ring and sulfonic groups appear at 1709, 1368 and 1021 cm^{-1}, respectively. Sulfonated copolyimides show high operating temperature where the first degradation of sulfonic groups occurs at around 180 °C. A higher degree of sulfonation of copolyimide results in a higher IEC. The water uptake of this sulfonated copolyimide is less than 4%. The proton conductivity of sulfonated copolyimide at room temperature depends on the proportion of SDDM. The obtained membranes possess the proton conductivities between 0.0016 and 0.0032 S cm^{-1}. The methanol permeability of sulfonated copolyimide also depends on the degree of sulfonation; the higher degree of sulfonation shows the higher methanol permeability. The highest methanol permeability of the sulfonated copolyimide is 2.7482×10^{-8} cm^2/s which is extremely lower than that of Nafion® (1.7400×10^{-6} cm^2/s).