CHAPTER V
CONCLUSIONS

The sulfonated PPEES and PEEK were prepared at various DSs using 98% sulfuric acid as a sulfonation agent. The membrane properties depended on the DS and the type of aromatic polymers. The water uptake, proton conductivity, and vanadium permeability increased with increasing DS. S-PPEES provided greater properties than S-PEEK because its structure was an amorphous and higher polarity of sulfon group promoting higher water uptake and proton conductivity. Futhermore, the properties of sulfonated polymers were greater than those of Nafion 117. The vanadium permeability of S-PPEES was higher than that of S-PEEK for the same DS. Comparing with Nafion, the vanadium permeability values of S-PEEK at DS lower than 73.32% and of S-PPEES at DS lower than 63.53% were lower than the vanadium permeability of Nafion 117. The selectivity of S-PPEES was higher than that of S-PEEK due to the proton conductivity. The optimum selecticity of S-PPEES was 158 S.cm/min at DS equal to 77.88% and the optimum selecticity of S-PEEK was 123 S.cm/min at DS equal to 73.32%. However, the selectivity values of S-PPEES and S-PEEK membranes were higher than Nafion 117, except the selectivity values of S-PEEK at DS equal to 39.02%, 44.14%, and 59.60% that are lower than that of Nafion. Therefore, the sulfonated polymer membranes fabricated here, S-PEEK and S-PPEES, for VBRF are potetial membrane candidates for VBRF.