

Synthesis and properties of pendant sulfonated multiblock copolymer based on poly(arylene ether ketone) for proton exchange membrane fuel cells

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Poly(arylene ether ketone)(PAEK) membrane for PEMFC is the one of approachable candidate membrane to replace Nafion which is the most popular commercial membrane. But Nafion has critical problems on price and stability over 80°C in fuel cell. To solve these weakness, Poly(arylene ether ketone) (PAEK) membranes have been researched in several years. However, they have a few points to overcome, which are narrow water channel and high water uptake at high temperature. Pendant sulfonated multiblock copolymer based on poly(arylene ether ketone) is composed of hydrophobic and hydrophilic multi-block and Sulfonated pendant group is grafted into hydrophilic block. In this system, hydrophilic block develops uniform water channel size with flexible sulfonated pendant group and hydrophobic block takes a role in phase separation, respectively. In this study, hydrophilic and hydrophobic block were polymerized alternatively with various sulfonation agents. Proton conductivity, water uptake, ion-exchange capacity(IEC) and ion cluster size were analyzed.