Durability enhancement of sulfonated poly(ether sulfone) membranes by increase in molecular weight for PEMFC

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Poly (arylene ethers) are well known engineering thermoplastics with many desirable properties such as good mechanical strength and high thermo-oxidative stabilities.
So far, they have normally followed the typical polymerization method with an azotropic solvent and a main solvent for dehydration and polymerization by ether-bonding. However it is difficult to synthesize reproducibly high molecular weight sulfonated polymers by the typical polymerization method because the used monomers are not completely miscible in the azotropic solvent. Also, very high purity of the monomers is critically required to synthesize high molecular weight polymers.
To overcome these drawbacks, we have developed a totally simple and reproducible polymerization procedure. In this study, as a representative polymer, sulfonated poly (ether sulfones) (SPES) are synthesized. And the characteristics of the polymers prepared by the simple method are compared with those by typical method.