

Characteristic highly sulfonated polymer blend-based composite membranes

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Sulfonated PEEK(poly ether ether ketone) (SPEEK) membranes is regarded as a good candidate due to good thermal stability, good mechanical property and high proton conductivity, under fuel cell environment. However, it is limited in its application because of its brittleness, methanol crossover and the super swelling with high sulfonated degrees. PBI as one type of polymeric material possesses have good mechanical strength, thermal stabilities at high temperatures, highly impermeable to methanol, and the water drag coefficient is nearly zero. This work is focused on enhancing fuel cell performance with proton conductivity and good mechanical property by blending SPPEK and SPBI. The cell performance is enhanced with increasing SPBI content, because of the interaction between sulfonic groups and amine groups. The morphology of blended membrane was characterized by FE-SEM(scanning electron microscopy) and AFM(atomic force microscopy), thermal stabilities by TGA(thermo gravimetric analysis) and water uptake, proton conductivity.