SPEEK/BPO_4 composite membranes using two types of matrix for fuel cell applications

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Proton conductive SPEEK/BPO_4 composite membranes were prepared by sol-gel process. Tripropylborate and phosphoric acid were used as precursors. The matrix polymers which possess the various degree of sulfonation were obtained by two types of synthesis method. PEEK(Victrex®) was sulfonated using sulfuric acid as sulfonating agent to make post-sulfonated polymers. Pre-sulfonated copolymers were synthesized using sulfonated monomers. The membranes were characterized with proton conductivity, water uptake, ion-exchange capacity, TGA and SEM. SEM micrographs show that the BPO_4 particles are homogenously dispersed in the matrix polymers and the BPO_4 particle size was greatly influenced with matrix polymer. Pre-sulfonated polymers had much smaller BPO_4 particles than the post-sulfonated polymers.