

지속성장 가능한 PAEK 기반 연료전지막 합성 및 특성(Synthesis and properties of sustainable fuel cell electrolyte membranes based on sulfonated poly(arylene ether ketone))

김덕준*

성균관대학교 화학공학과

(djkim@skku.edu*)

Poly(arylene ether ketone) was synthesized in a variety of chemical structure for the application in fuel cell electrolyte membranes. Ce³⁺ ion was introduced along with 18-crown-6-ether to the membranes in order to enhance the anti-oxidation property of the membranes, as it quenches the hydroxyl radicals, the major oxidation promoter, in fuel cell operation. The chemical and physical structures of the composite membranes were investigated using FTIR, ¹H-NMR, SEM, EDX, and SAXS. According to Fenton's test, the pristine SPEEK membrane was completely degraded by oxidation in 24h but the composite membranes containing Ce³⁺/18-crown-6-ether complex was stable up to 70 h without any degradation. As the concentration of Ce³⁺ ions increased, the ion cluster dimension of the membranes decreased and thus reduced the proton conductivity. Other properties such as thermal and mechanical stability and water uptake were not noticeably affected at the low concentration of Ce³⁺ up to 2 mole % based on sulfonic acid groups.