

## Preparation of anion-exchange membranes using polysulfone for alkaline solid polymer electrolyte fuel cells

박진수\*, 김지석, 김홍건, 양태현, 윤영기, 이원용, 김창수  
한국에너지기술연구원 신에너지연구부 고분자연료전지연구단  
(park@kier.re.kr\*)

Alkaline solid polymer electrolyte fuel cells (ASPEFCs) are a hybrid of polymer electrolyte membrane fuel cells (PEMFCs) and alkaline fuel cells (AFCs). PEMFCs use proton-conducting membranes, but ASPEFCs anion-exchange membranes (AEMs) as an electrolyte. In this regard, ASPEFCs using AEMs have several advantages when compared to PEMFCs and AFCs: i) use of non-noble catalysts as an electrode, ii) use of cheaper membranes, iii) simplified water management and iv) mitigation of CO<sub>2</sub> contamination. In this study, AEMs were prepared from chloromethylated polysulfone (CMPSf) and a number of mono- and diamine compounds. The AEMs are prepared in two steps: i) introduction of chloromethyl-groups as substituents for aromatic nuclei to an aromatic polymer in the presence of a Friedel-Crafts catalyst ii) introduction of the basic groups into polymer by treatment with mono- and diamine which are *N*-trimethylamine (TMA) and *N,N,N',N'*-tetramethylhexanediamine (TMHDA), respectively. The quaternization with diamines proceeds as a mono-reaction (mono-quaternization) and as a cross-linking reaction (bi-quaternization) in part.