

Effect of solvent on Nafion ionomer and catalyst layer for proton exchange membrane fuel cell application

김태현¹, 이재유¹, 이성철^{1,2,*}

¹한양대학교 화학공학과; ²한양대학교 수소연료전지공학과

(scyi@hanyang.ac.kr*)

In the proton exchange membrane fuel cell (PEMFC), the electrode structure impacts the fuel-cell performance, durability, and cost. However, studies of the factors that affect the final morphology of the electrode are still insufficient. In this study, the effect of the solvent on the Nafion chain mobility and consequential the structure of the catalyst layer was investigated by using ¹⁹F NMR and atomic force microscopy (AFM). From ¹⁹F NMR and AFM experiments, the high Nafion chain mobility shows strong phase-separated structure of the agglomerated catalyst layer. In addition, the electrochemical performance of the membrane electrode assemblies (MEAs) fabricated from different solvents was examined in detail by cell polarization and cyclic voltammetry.

Acknowledgement: This work was supported by the New & Renewable Energy of the Korea Institute of Energy Technology Evaluation and Planning (KETEP) grant funded by the Korea government Ministry of Knowledge Economy. (No. 20113010030030)