

Computational Fluid Dynamics Modeling of polymer electrolyte fuel cells and Parametric Study
- the effect of membrane thickness -

윤창현, 이성철*
한양대학교
(scyi@hanyang.ac.kr*)

A three-dimensional, mathematical model for polymer electrolyte fuel cells was developed in order to analyze physical and electrochemical phenomena using Computational Fluid Dynamics (CFD) technique. The numerical model was validated against the experimental data of average polarization curve under 100 % humidified conditions for 2.5/2.0 and 2.5/3.0 anode/cathode stoichiometry ratios, respectively. In this study, we mainly focus on performance of fuel cell system in accordance with its various membrane thickness; Nafion 112, 115, 117. From the results, the thinner membrane case produces higher performance, because it improves membrane hydration by increasing the rate of back-diffusion, which lowers the ionic resistance.