A two – dimensional mathematical model for a single – phase Direct Methanol Fuel Cell

이동주, 이성철*
한양대학교
(scyi@hanyang.ac.kr*)

A two-dimensional, single-phase, isothermal model for a direct methanol fuel cell (DMFC) is presented. The traditional continuity, momentum, and species conservation equations are coupled with electrochemical kinetics in both the anode and cathode catalyst layer. Methanol is considered that is the liquid phase at the anode side, and Oxygen is considered that is only the gas phase at the cathode side. Diffusion and crossover of methanol are modeled and the mixed potential of the oxygen cathode due to methanol crossover is included. Kinetic and diffusional parameters are estimated by comparing the model data from experimental data. The model is used to study the effects of methanol cross over, the effects of different Naffion of membrane. This CFD model can be solved rapidly so that is suitable for inclusion in real-time system level direct methanol fuel cell (DMFC) simulations.