Ionic conductivity of perfluorinated acid membranes for fuel cells : Applicability of structure effect and modeling

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We have introduced the Ionic conductivity of perfluorinated acid membranes for analyze the polymer/water systems with structure effect for fuel cells. We proposed a molecular thermodynamic framework to describe Ionic conductivity of polymer membrane solutions. To understand the membrane/water behavior, in this study, we develop a lattice model for polymer-solvent system, Lattice Cluster Theory (LCT). To take into account the highly oriented interactions between segments, the proposed model requires an additional parameter ($\delta\varepsilon/k$) related to the energy of the oriented interaction. We finally proposed the total cell voltage model for PEMFC with our work.