Polymer Electrolyte Fuel Cell Modeling and Experimental Validation: Current Issues and Problems

Chao-Yang Wang

Electrochemical Engine Center (ECEC), and Department of Mechanical & Nuclear Engineering The Pennsylvania State University University Park, PA 16802 E-mail: cxw31@psu.edu

This presentation will discuss the current status of polymer electrolyte fuel cell modeling and experimental validation. Focus will be placed on pointing out pending issues and problems, thereby identifying future directions of research. We shall review current advances in fundamental understanding and development of diagnostic and modeling tools for various length scales¹⁻⁴. In particular, we shall describe diagnostic and modeling efforts to understand and characterize low Pt loading electrodes and effects of water flooding in these low Pt systems.

References:

1. C.Y. Wang, Chem. Rev., 104 (2004) 4727.

2. P.K. Sinha, P.P. Mukherjee and C.Y. Wang, J. Mat. Chem., 17 (2007) 3089-3103.

3. T. A. Trabold, J. P. Owejan, J. J. Gagliardo, D. L. Jacobson, D. S. Hussey, and M. Arif, Use of neutron imaging for proton exchange membrane fuel cell (PEMFC) performance analysis and design, in *Handbook of Fuel Cells* Eds. W. Vielstich, A. Lamm and H. Gasteiger, Wiley and Sons Ltd., Vol.6, 2009.
4. U. Pasaogullari and C.Y. Wang, *Modeling and Diagnostics of Polymer Electrolyte Fuel Cells*, Modern Aspects of Electrochemistry, Vol.49, Springer, 2010.