CONFERENCE WEBSITE
HTTPS://WWW.IAHE-FCD.ORG/WFCC2021

2021 WORLD FUEL CELL CONFERENCE

AUGUST 17-20, 2021 | WATERLOO, CANADA

Name	Li Chen
Affiliation	Xi'an Jiaotong University

Invited Keynote Lecture

Presentation Title	Pore-scale and Multiscale Numerical Study of Physicochemical Processes in PEM Fuel Cell
Abstract (Approximately 200 words)	Advanced pore-scale and multi-scale numerical methods have been developed to study the physical-chemical-thermal processes inside PEM fuel cells. Pore-scale models based on the Lattice Boltzmann method (LBM) are proposed to study coupled multiphase flow, heat and mass transfer and electrochemical reaction in gas diffusion layer and catalyst layer. Macroscopic transport properties of the porous electrodes are predicted. Effects of pore structures and surface wettability on liquid water and distributions are studied. Local transport resistance across the pore-ionomer interface in nanoscale catalyst layer is explored. The relationship between structures, transport processes and performance is investigated in detail. Multi-scale numerical method is then developed by upscaling the pore-scale models into cell-scale models. Based on the pore-scale and multiscale studies, structures of the porous electrodes are optimized to alleviate flooding, enhance mass transport and reduce cell cost.
Biographical Sketch (Approximately 200 words)	Li Chen is a full Professor at Xi'an Jiaotong University (XJTU) China. He obtained his PhD degree in Engineering Thermophysics at XJTU in 2013, followed by a Director Postdoc at Loa Alamos National Lab. His research focuses on transport phenomena in porous media with background of fuel cell, flow battery and hydrocarbon resource exploitation. He has published 72 SCI papers in a variety of top journals, including International Journal of Heat and Mass Transfer, Journal of Power Sources, Langmuir, Nano Energy, International Journal of Hydrogen Energy, Journal of Computational Physics, Physical Review E, Electrochemica Acta, etc. His publications have been cited over 3300 times (Google Scholar), with personal H index at 32. Furthermore, his research has also resulted in over 40 conference presentations (including 6 keynote presentations), 4 patents and 3 software copyrights. He was the winner of Young Scientist Award of Asian Union of Thermal Science and Engineering. He is on the editorial board of international Journal Frontiers in Heat and Mass Transfer.