Aimy Bazylak, J Pet Environ Biotechnol 2014, 5:4
http://dx.doi.org/10.4172/2157-7463.S1.006

OMICS Group Conferences
Accelerating Scientific Discovery

2nd World Congress on
Petrochemistry and Chemical Engineering
October 27-29, 2014 Embassy Suites Las Vegas, USA

Porous media for improved polymer electrolyte mebrane fuel cells

Aimy Bazylak
University of Toronto, Canada

The hydrogen polymer electrolyte membrane (PEM) fuel cell provides enormous potential for a clean energy infrastructure. However, due to cost and inefficiency barriers, PEM fuel cells have not yet reached widespread commercial adoption. Mass transport limitations such as liquid water flooding and high oxygen diffusion resistance to the catalyst sites still lead to inefficiencies. If these issues become resolved, smaller and more reliable fuel cells could be produced at a lower cost. Mass transport limitations can be minimized through the development of optimized materials, which have tailored pore structures, connectivities, conductivities, and surface wettabilities. Currently, the porous materials in PEM fuel cells have not been customized for mass transport, due to the lack of information about their structure and the dominating mass transport mechanisms. In this talk, techniques for analyzing the three-dimensional structure of the PEM fuel cell gas diffusion layer (GDL) and the microporous layer (MPL) will be discussed. The GDL is a heterogeneous, fibrous network of carbon fibres, while the MPL is a mixture of carbon particles and polymeric binder. The impact of heterogeneous porosity profiles and material distributions on liquid water and thermal transport will also be discussed.

Biography

Aimy Bazylak is an Associate Professor in the Dept. of Mechanical & Industrial Engineering at the University of Toronto. In 2012 Professor Bazylak received the Ontario Ministry of Research and Innovation Early Researcher Award. In 2013 she was awarded a prestigious NSERC Discovery Accelerator Supplement, and in 2014 she was elected as a Fellow of the Canadian Society for Mechanical Engineering. She is the associate director of the University of Toronto Institute for Sustainable Energy and associate director of a NSERC Collaborative Research and Training Experience (CREATE) program focused on developing clean energy solutions for remote communities in northern Canada.

abazylak@mie.utoronto.ca