FUEL CELL SEMINAR & ENERGY EXPOSITION

PEMFC R&D PART 2
WEDNESDAY, NOVEMBER 6 - ROOM 101-A, 4:00 PM - 5:30 PM

- **Porosity Gradient Effects of the Porous Flow Field on the Performance of the PEM Fuel Cell -** *DongGyun Kang, Seoul National University*

  - In this presentation, we introduce novel porous flow field with porosity gradient in the PEMFC. We designed several different metal foam flow fields with different porosity gradients. We could investigate the effects of porosity gradient in the porous flow field on the performance of the PEMFC by evaluating and analyzing polarization curve, power curve, and electrochemical impedance spectroscopy test results. Finally, we verified that the performance of the fuel cell improved with tailored porosity gradient in the metal foam flow field.

- **Intermediate Temperature-Range PEM Fuel Cells with Ion-Pair Membranes and Phosphonated Ionomers -** *Michael Hibbs, Sandia National Laboratories*

  - Discussion of a project to develop membranes and ionomers for PEM fuel cells that will operate at temperatures above 200 C.

- **Functionalized Structured Ionic Liquids as Bridges for Proton Conductivity in Proton-Exchange Membrane Fuel Cells (PEMFCs) -** *Dr. Isabel Vazquez Fernandez, University of Tours*

  - In this work, we have explored PVDF/functionalized-ILs (FILs) composite membranes which showed promising results for their application in PEMFCs. Full characterization of these membranes will be reported.

- **Multi-functional MPL Materials -** *Paul Matter, pH Matter, LLC*

  - In this talk we present a multi-functional MPL that significantly improves cell power and water management, thus lowering system cost. The MPL is based on a surface-treated hydrophobic carbon and Nafion, enabling processing of the MPL without using insulating binders, thus improving gas permeability and eliminating high-temperature sintering. The MPL can also contribute to oxygen reduction reaction (ORR) activity in the cathode, further improving cell power. Properties of the novel multi-functional MPL materials, characterization of MPL coatings, and MEA data will all be presented.

- **Multi-Functional Catalyst Support -** *Minette Ocampo, pH Matter, LLC*

  - In this paper, we report a multi-functional carbon support, based on doped carbon nano-structures (i.e. CNxPy), that is engineered to perform better than conventional PEMFC pure carbon supports with low PGM loadings. Work in Phase I demonstrated the feasibility of CNxPy supports to improve the durability of low-PGM catalysts without the need for significant alloying using multi-functional CNxPy supports developed at pH Matter. Current work is focused on further optimization of the Multi-Functional Carbon Support (MFCS) to achieve high power performance and stability in MEA testing.