

**Date: July 13**  
**Time: 10:15 am – 11:15 am**  
**Room: SL 165**

**Everyone is invited**

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**Development of High Performance and Stability PEFC Catalysts and  
MEA Using Modified Carbon Supports**

**Dr. Jian Xie, Principal Research Scientist,  
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**Abstract.**

Platinum nanoparticles supported by carbon (i.e. Pt/C) are the major catalysts for polymer electrolyte fuel cells (PEFC). The successful commercialization of fuel cells not only requires the catalyst to have high performance but also high stability and durability. The kinetic performance of the Pt/C catalyst depends on Pt nanoparticle dispersion on a carbon surface. Conventional carbon surfaces are not homogeneous in terms of surface energy and chemical composition. This results in an inhomogeneous dispersion of Pt nanoparticles, and consequently lower performance. A new approach was taken to improve Pt nanoparticle dispersion on carbon, as well as catalyst stability, using a modified carbon surface, to which different functional groups are attached. This presentation will focus on the development of new catalysts and MEAs using this new approach. The characterization (using XRD, BET, TEM, SEM, XPS, and Hg porosimetry) and performance of these catalysts and MEAs under different relative humidity will be presented as well as its durability and stability. The possible mechanism of improving Pt nanoparticle dispersion will be discussed.

**About the Speaker.**

Dr. Xie, a principal research scientist at Battelle Memorial Institute, has worked on fuel cell R&D for many years. Prior to Battelle, as the program manager and senior electrochemical engineer at Cabot Corp, he conducted extensive work on catalyst development for fuel cells. Dr. Xie spent four years at the Los Alamos National Laboratory on fuel cell research covering everything from membrane electrolytes, catalysts, and membrane electrode assembly (MEA) to the durability of fuel cells. As a system engineer, he was in charge of developing the electric propulsion system for the Electric Vehicle (EV) and Hybrid EV at General Motors Advanced Technology Vehicle, Indianapolis Technical Center. Dr. Xie received his Ph.D. from Miami University and his B.S. in chemical engineering (with emphasis on electrochemical engineering) from Tianjin University.