

Deborah J. Myers

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Professional Experience

***Argonne National Laboratory, Chemical Sciences and Engineering Division,
Argonne, Illinois***

- Group Leader, Hydrogen and Fuel Cell Materials (January 2003-present)
- Operating Agent for the International Energy Agency's "Polymer Electrolyte Fuel Cell Annex" (January 2003-present)
- Group Leader, Solid Oxide Fuel Cells (April 2002-December 2002)
- Group Leader, Shift Catalysis (December 2001-April 2002)
- Chemist, Fuel Cell Section (April 1992-December 2001)
- Postdoctoral Appointee, Aqueous Corrosion Group (October 1989-April 1992)

Current Research Experience

Materials development and characterization to improve the durability, lower the cost, and reduce the size and weight of fuel cell power and hydrogen production systems, including the following projects:

- Non-Pt cathode electrocatalysts for polymer electrolyte fuel cells
- Ethanol oxidation catalysts
- Cathode electrocatalyst degradation mechanisms
- *In situ* x-ray studies of polymer electrolyte and solid oxide fuel cell cathode electrocatalysts
- Studies of polymer electrolyte fuel cell stacks and membrane-electrode assemblies for transportation applications (with Northern Illinois University)

Past Research Experience

Development and characterization of materials for fuel processors, direct methanol fuel cells, and solid oxide fuel cells, and characterization of electrochemical systems, including projects in the following areas:

- Dendrimer-based polymer electrolytes
- Sulfur-tolerant solid oxide fuel cell anodes
- Water-gas shift catalysis
- X-ray absorption spectroscopy of direct methanol fuel cells
- Anion-conducting membranes for direct methanol fuel cells
- Effect of underpotentially-deposited layers on outer sphere electron transfer reactions
- Heterogeneous electron transfer kinetics at high temperatures and pressures

- X-ray reflectivity studies of the electrochemical interface, electrochemical and electron spectroscopic study of mixed adlattices on polycrystalline and single crystal platinum electrodes
- Electrochemical synthesis of high temperature superconductors
- Surface science studies of corrosion inhibition by phosphonates

Selected Publications, Presentations and Patents

- “Scientific Aspects of Polymer Electrolyte Fuel Cell Durability and Degradation”, Rod Borup, Jeremy Meyers, Bryan Pivovar, Yu Seung Kim, Rangachary Mukundan, Nancy Garland, Deborah Myers, et al., *Chemical Reviews*, 107, posted on the web on September 13, 2007.
- “Dissolution of platinum and platinum alloy polymer electrolyte fuel cell cathode electrocatalysts”, Xiaoping Wang, Deborah Myers, Nancy Kariuki, and Romesh Kumar, 211th Electrochemical Society Meeting, Chicago, IL, May 6-10, 2007.
- “Palladium-Base Metal Nanoparticles as Cathode Electrocatalyst for PEMFCs”, Nancy Kariuki, Xiaoping Wang, and Debbie Myers, 211th ECS Meeting Chicago, May 6-10, 2007.
- “The Effect of Hydrocarbon Contaminants on the Oxygen Reduction Activity of Pt/C Electrocatalysts: A Rotating Disk Electrode Study”, Matt C. Smith and Deborah J. Myers, 211th ECS Meeting Chicago, May 6-10, 2007.
- “Proton Conducting Membrane for Fuel Cells”, D. Colombo, M. Krumpelt, D. J. Myers, and J. P. Kopasz, U.S. Patent No. 6,977,122, December 20, 2005.
- “Stability and Dissolution of the Platinum Crystal Surfaces in Perchloric Acid”, V. Komanicky, K.C. Chang, A. Menzel, N.M. Markovic, H. You, X. Wang, and D. Myers, *J. Electrochem. Soc.*, 153, B446-B451 (2006).
- “Effect of Voltage on Platinum Dissolution: Relevance to Polymer Electrolyte Fuel Cells”, X. Wang, R. Kumar, and D. J. Myers, *Electrochemical and Solid State Letters* 9(5), A225-A2276 (2006).
- “Fundamental Studies of Platinum Electrocatalyst Stability”, D. Myers, X. Wang, and R. Kumar, Invited Presentation at the 2nd Annual Fuel Cells Durability & Performance 2006, Miami Beach, FL, December 7-8, 2006
- “Polymer Electrolyte Fuel Cell Cathode Electrocatalysts”, X. Wang, R. Kumar, and D. J. Myers, 2005 Fuel Cell Seminar, Palm Springs, CA, November 14-17, 2005.
- “High-Temperature Polymer Electrolyte Membranes based on Dendritic Macromolecules and Organic/Inorganic Hybrids”, S.-W. Choi, S. Niyogi, D. J. Myers, and R. Kumar, 2004 Fuel Cell Seminar, San Antonio, TX, November 1-5, 2004.
- “High-Temperature Polymer Electrolyte Fuel Cell Electrolytes Based on Dendronized Polymers,” S. Niyogi, S.-W. Choi, and D. J. Myers, Presented at 206th Meeting of the Electrochemical Society, Honolulu, HI, October 3-8, 2004.
- “Density Functional Calculations on CO Attached to Pt_nRu_(10-n) (n=6-10) Clusters”, R.C. Binning, Jr., M.-S. Liao, C.R. Cabrera, Y. Ishikawa, H. Iddir, R. Liu, E.S. Smotkin, A.J. Aldykiewicz, Jr., and D.J. Myers, *Journal of Quantum Chemistry*, 77, 589 (2000).

- “X-ray Absorption and Electrochemical Studies of Direct Methanol Fuel Cell Catalysts, D.J. Zurawski (Myers), A.J. Aldykiewicz, Jr., S.F. Baxter, and M. Krumpelt, 1996 Fuel Cell Seminar, Orlando, FL, November 17-20, 1996.
- “In-situ X-ray Reflectivity Study of Incipient Oxidation of Pt(111) Surface in Electrolyte Solutions”, H. You, D. J. Zurawski (Myers), Z. Nagy, and R. M. Yonco”, *J. Chem. Phys.*, 100, 4699 (1994).

Selected Recent Awards

- 2004, Pacesetter Award, Argonne National Laboratory
- 2004, DOE Hydrogen Program R&D Award
- 2000, National Laboratory Fuel Cell R&D Award, U.S. Department of Energy

Education

- Ph.D., Chemistry, University of Illinois, Urbana-Champaign, Illinois, 1989
- B.A., Chemistry, Knox College, Galesburg, Illinois, 1984