



Pezhman Shirvanian, Assistant Professor

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Education

Brown University	Chemical Engineering	Ph.D., 2004
Stanford University	Mechanical Engineering	Postdoc, 2005

Work Experience

2014- Present Assistant Professor, Mechanical Engineering, Tennessee Tech University, TN
2012-2014 Lead Engineer, General Electric Company, Energy Storage, Schenectady, NY
2005-2012 Research Engineer, Ford Motor Company, Fuel Cell Research, Dearborn, MI

Research Projects/Ideas/Concepts

- **PEM Fuel Cells:** Development of pseudo-bulk electro-catalyst for in PEM fuel cells
- **NaMx Batteries:** Enhancement of charge acceptance in sodium metal halide (NaMx) batteries
- **Metal-Air Batteries:** Design of efficient bi-functional electro-catalysts for metal-air batteries
- **Solar Fuels:** Band gap/active site engineering for solar hydrogen generation photo-catalysts

Awards

"Clear Thinker" Award, General Electric Co. Feb., 2013
Innovation Award, General Electric Co. Dec., 2012

- For "Novel Design for Low Temperature NaMx Battery" invention

Excellence Award, Ford Motor Co. April, 2011

- For "Acting as Principal Investigator (PI) for DOE proposal DE-FOA-0000360/Catalyst"

Research and Advanced Engineering Innovation Award, Ford Motor Co. May, 2010

- For "Method and Apparatus for Coating Catalytic Objects" intellectual property filing

Inventor Award, Ford Motor Co. April, 2010

- For five high impact intellectual property filing in 2010

Patent Award, Ford Motor Co. 2008

- For prolific, high impact invention disclosures as judged by Ford's patent committee

Inventor Award, Ford Motor Co. 2007

- For five inventions ranked "HIGH" by Ford's patent committee

Relevant Publications

- [1] P. Shirvanian; "Tuning Catalytic Properties of Bimetallic Surfaces for Oxygen Reduction Reaction in PEM Fuel Cells: A DFT Study of Pseudo-morphic Pt/Ir Overlayers". *Submitted*.
- [2] P. Shirvanian; "Thin Film Catalyst on Porous Media and Electrochemical Cell Employing the same", Patent, US 8465632, China 201110452613.5.
- [3] P. Shirvanian; "Catalyst Layer Supported on Nano-hairs of Metal Oxides", Patent, US8623779, Germany 102012201637.6, China 201210030973.0.
- [4] Y. Shao, T.Yu, B. Merinov, P. Shirvanian, W. Goddard III; "Mechanism for Oxygen Reduction Reaction on Pt₃Ni Alloy Fuel Cell", *J. Phys. Chem. C*, 2012, 116, pp 21334–21342.
- [5] Y. Shao, T.Yu, B. Merinov, A.P. Shirvanian, W. Goddard III; "The Oxygen Hydration Mechanism for the Oxygen Reduction Reaction at Pt and Pd Fuel Cell Catalysts", *J. Phys. Chem. Lett.*, 2011, 572–576.
- [6] P. Shirvanian, A. Bertuch, K. Sun; "Electrochemical Reduction of Oxygen on Pt Ultra-Thin Film Electrocatalyst Prepared by Atomic Layer Deposition (ALD)", *Submitted*.
- [7] P. Shirvanian, J.A. Adams; "Fuel Cell", Patent: US2011/0014538A1.
- [8] P. Shirvanian; "Layered Catalyst", Patent: US2012/0202683A1.
- [9] P. Shirvanian; "Catalyst Layer Having Thin Film Nanowire Catalyst and Electrode Assembly employing the same", US12/770084