CURRICULUM VITAE

Wu, Gang, *Ph.D. Associate Professor*

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EDUCATION

- 2004. Ph.D. Environmental (Chemical) Engineering, Harbin Institute of Technology, Harbin, China.
  Thesis: "*Electrodeposited Co-Ni alloy composite coatings and their oxide films for high-temperature and electrocatalysis applications"*
- 1999, M.S. Applied Chemistry, Harbin Institute of Technology, Harbin, China.
- 1997, B.S. Electrochemical Engineering, Harbin Institute of Technology, Harbin, China.

PROFESSIONAL EXPERIENCE

- Aug 2018- *Associate Professor*, University at Buffalo, SUNY, Buffalo, NY
- Aug 2014-Aug 2018, *Assistant Professor*, University at Buffalo, SUNY, Buffalo, NY
- May 2010-Aug 2014 *Staff Scientist*, Los Alamos National Laboratory, Los Alamos, NM
- Jan 2008-May 2010, *Postdoc*, Los Alamos National Laboratory, Los Alamos, NM
- Feb 2006-Jan 2008, *Postdoc*, Chemical Engineering, University of South Carolina, Columbia, SC
- Jan 2004-Jan 2006, *Postdoc*, Department of Chemistry, Tsinghua University, Beijing, China

RECOGNITIONS

- To date (August 2019), Dr. Wu has been granted more than **$4.2 M** funding from external federal agencies (DOE and NSF) since August 2014 when he joined UB. Those **14** projects (3 NSF and 11 DOE) focus on the development of advanced materials for electrochemical energy conversion and storage technologies such as fuel cells, water splitting, batteries, and renewable fuels (NH_3).
- Dr. Wu has published more than **200** peer-reviewed scientific papers in prestigious journals including *Science, Nature Catalysis, JACS, Energy Environ. Sci., Angew Chem*., *Adv. Mater, Nano Lett., ACS Nano, etc.*; **>18,200** citations, *h* index: **66,** *i*10 index: 165 [Google Scholar]; 6 patents; 9 invited book chapters, >100 presentations;
- Dr. Wu is internationally recognized as a leading researcher in the field of electrocatalysis and fuel cell catalysts. His *Science* paper (*Wu G. et al., Science, 332, 443, 2011; cited > 2820 times to date in Google Scholar*), for the first time, demonstrated that, instead of precious metals (e.g., Pt), the inexpensive and sustainable catalysts from earth abundant elements (C, N, Fe, or Co) can catalyze the sluggish oxygen reduction reaction in low-temperature fuel cells.

- Dr. Wu was acknowledged by Clarivate Analytics as one of 2018 Highly Cited Researchers, in recognition of exceptional research performance demonstrated by production of multiple highly cited papers that ranked in the top 1% in Web of Science. (*There are only two professors at UB, who received the recognition in 2018*)
- He was invited to publish perspective articles and progress reports on fuel cells, batteries, and other electrochemical energy technologies in high-profiles journals including *Nature Catalysis, Materials Today, Nano Today, Chemical Review, Chemical Society Review, Advanced Materials, Advanced Energy Materials, ACS Energy Letters, and Nano Energy*.
- More than 1200 times manuscript peer-review (~3-4 time per week) for renowned journals in his field including *Science*, *Nature, PNAS, Nature Chemistry, Nature Nanotechnology, Nature Commun. Nature Energy*, *Nature Catalysis*; *JACS*, *Angew Chem.*, *Adv. Mater., Nano Letters, ACS Nano, Nano Today*, *Energy Environ. Sci., Adv. Energy Mater., Adv. Func. Mater., Small, Chem. Mater., Nano Energy, Applied Energy, Nanoscale, J. Phys. Chem., ACS Catal., Carbon, ACS Appl. Mater. Interfaces, PCCP, Electrochem. Commun., Electrochim Acta, J. Power Sources, etc.*
- Invited to be a panellist or proposal reviewer for *National Science Fondation (NSF), U.S. DOE Office of Science, Office of Energy Efficiency and Renewable Energy (EERE), Czech Science Foundation, Research Grants Council of Hong Kong, National Research Foundation of Singapore, United States-Israel Binational Science Foundation, Estonian Research Council, and Natural Sciences and Engineering Research Council of Canada.*

ACADEMIC AWARDS / SCHOLARSHIPS

- UB SEAS Early Career Researcher of the Year Award, 2017
- LANL LDRD-ER Award, 2014
- DOE, EERE office Outstanding Research Team Award, 2011
- LANL Early Career LDRD Award, 2010
- Fuel Cell Tech Team's 2009 highlights by USCAR, 2010
- Postdoctoral Science Research Award of China, 2004
- Petroleum Excellent Ph. D student Scholarship of China, 2003

HONORS

- Recognized as a 2018 Highly Cited Researcher by Thomson Reuters, Clarivate Analytics
- At-large Member of Energy Technology Division, Electrochemical Society
- Advisor of a Ph.D. student (Mr. Shiva Gupta) received Travel Grant of 231st Electrochemical Society Meeting, New Orleans, IN, May 2017.
- Advisor of a senior undergraduate student (Miss. Jingyun Wang) received UB Excelllence of Undergraduate Research and Scholarship, 2017.
- Selected as the most Favorite Professor in CBE by AIChE UB Student chapter, 2016.
- Advisor of a Ph.D. student (Mr. Shiva Gupta) received UB CBE Graduate Research Poster Award, 2015.
- Rank as Top 1% reviewer for ACS Catalysis, 2015
- The *Science* paper was ranked as Top 10 cited articles in *Chemistry*, 2013
- Selected as a Featured Scientist at LANL, 2011
- The Top 10 Cited Paper in the journal of *Electrochemistry Communications*, 2010

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES:

- Member of American Institute of Chemical Engineering (AIChE), 2014-
- Member of Electrochemical Society (ECS), 2008-
- Member of American Chemical Society (ACS), 2008-
- Member of Materials Research Society (MRS), 2013-
- Board Committee Members of The International Academy of Electrochemical Energy Science
- Editorial Board of *ChemistrySelect* (a new journal from ChemPubSoc Europe, Wiley-VCH Publisher)
- Editorial Board Member for *Scientific Reports*, (Nature Publishing Group)
- Associate Editor of *RSC Advances* (a journal in the Royal Society of Chemistry, UK)

UNIVERSITY SERVICE:

- Panel reviewer for "IMPACT" proposals, 2016 and 2017.
- Panel reviewer for pre-selection of NSF Major Research Instrumentation Program (MRI) proposals at UB, 2016
- Reviewer for "RENEW" seed proposal

COLLEGE OR PROFESSIONAL SCHOOL SERVICE:

- Tenure Promotion Committee member in the School of Engineering and Applied Science.
- Taught 4th Grade students (60, most of them are African American) about battery principles and fabrication during the Field trip of Westminster Elementary School (an event hosted by SEAS), January 2015.
- Participate "Science in Elementary" (SIE) program organized by the School of Engineering and Applied Science, 2015-2016.

DEPARTMENTAL SERVICE:

- Serving as a co-organizer for annual Graduate Research Symposium in Department of Chemical and Biological Engineering at UB, 2014-2016.
- Scientific advisor for Chem-E-Car for AIChE UB student chapter
- Committee member of undergraduate
- Searching committee member of new faculty hiring

COMMUNITY SERVICE:

- National Science Foundation (NSF) Panel Reviewer for CAREER proposals in *Electrochemical Systems* and *Catalysis* program; Ad Hoc review for NSF Engineering Research Center (ERC) proposals, 2019.
- National Science Foundation (NSF) Panel Reviewer for *Catalysis* and *Energy Sustainability* programs 2019.
- National Science Foundation (NSF) Panel Reviewer for *Chemical Catalysis* program 2018.
- Leading organizer for symposia *"Fundamentals of Electrochemical Processes"* and *"Materials for Electrochemical Energy Storages"*; co-organizer for "*Electrocatalysis and Photocatalysis*" at American Institute of Chemical Engineering (AIChE) meeting, 2016, 2017, 2018, and 2019.

- Leading organizer for the symposium "*Energy Conversion Systems Based on Nitrogen* 3" at 237th *Electrochemical Society Meeting* (ECS), Montreal, Canada, May 2020.
- Symposium co-organizer for "*Innovative Chemistry & Electrocatalysis for Low-Carbon Energy & Fuels: Discovery to Application*" at 257th American Chemical Society National Meeting, Orlando FL, March 2018.
- Co-organizer for symposia "*Advances and Perspectives on Modern Polymer Electrolyte Fuel Cells - Symposium in Honor of Shimshon Gottesfeld*", "*Energy Conversion Systems Based on Nitrogen*", and "*Materials for Low Temperature Electrochemical Systems" at 235th* Electrochemical Society (ECS) Meeting in Dallas , May 2019.
- Leading organizer for symposium "*Energy Conversion Systems Based on Nitrogen*" and co-organizers for symposia "*Materials for Low Temperature Electrochemical Systems*" and "*Oxygen or Hydrogen Evolution Catalysis for Water Electrolysis*" at 233rd Electrochemical Society (ECS) Meeting in Seattle, May 2018.
- Leading organizer for Symposium "*Advanced Electrocatalysis for Clean Energy and Environment"* at 256th American Chemical Society National Meeting, Boston, MA, August 2018.
- Symposium co-organizer for "*Innovative Chemistry & Electrocatalysis for Low-Carbon Energy & Fuels: Discovery to Application*" at 254th American Chemical Society National Meeting, Washington DC, August 2017.
- Co-organizers for Symposia *"Electrocatalysis and Photoelectrocatalysis"*, and *"Composites for Environmental applications"*, at American Institute of Chemical Engineering (AIChE) meeting, 2015, 2016, and 2017.
- Co-organizer for symposium "*Multiple electron redox for battery technologies*" at 232nd Electrochemical Society Meeting (ECS), National Harbor, MD, October, 2017.
- Co-organizer for symposium "*Innovative Chemistry & Electrocatalysis for Low-Carbon Energy & Fuels: Discovery to Application"* at 254th American Chemical Society (ACS) National Meeting, August, Washington DC, 2017.
- Leading organizer for symposium "*Electrochemical energy materials"* at Northeastern Region Meeting for American Chemical Society (NERM), Binghamton, NY, 2016.
- Co-organizer and session chair for symposium "*Electrochemical energy production, conversion, and storage*" at 252rd American Chemical Society (ACS) National Meeting, Philadelphia, PA, August, 2016
- A session chair in *Electrochemical Society Meetings (ECS)*, 2015, 2016, and 2017.
- A co-organizer for International Electrochemical Science and Energy Conference, November, Nanning, Guangxi, China, 2015
- Serving as a peer reviewer for more than 1000 times for renowned journals in my fields including *Science, Nature Nanotechnology, Nature Energy, JACS, Adv. Mater., Nat. Commun, Nano Letters, ACS Nano, Nano Today, Energy Environ. Sci., Adv. Energy Mater., Adv. Func. Mater., Chem. Mater., Nano Energy, Small, J. Mater. Chem., ChemSusChem, Nanoscale, J. Phys. Chem., ACS Catal., Carbon, ACS Appl. Mater. Interfaces, PCCP, Scientific Reports, Electrochem. Commun., Electrochim Acta, J. Power Sources*, etc.
- Serving as proposal reviewer for *U.S. DOE Office of Science, Office of Energy Efficiency and Renewable Energy (EERE), Czech Science Foundation, Research Grants Council of Hong Kong, National Research Foundation of Singapore, United States-Israel Binational Science Foundation, Estonian Research Council, and Natural Sciences and Engineering Research Council of Canada.*

- **COURSES TAUGHT:**

- CE 328 Chem Enginering Lab and Lectures (*Spring*)
- CE 433/534, Materials Science and Corrosion (*Spring*), 90-110 undergraduate/graduate students
- CE 422/522, Electrochemical Energy and Environment (*Fall*), 40-50 undergraduate/graduate students

GRADUATION OF Graduate Students:

Ph.D. student (**2**): *Shiva Gupta*, graduated on December, 2017. (*Research scientist, Intel*); *Hanguang Zhang*, graduated on May, 2019, (*Postdoc at Los Alamos National Laboratory*)

M.S. students (**15**): Anix Casimir (*African American*); Haiyang Sheng; Kuo Ma; Surya Vamsi Devaguptapu, Min Wei, Zhi Qiao, Shuo Ding, Qing Lan, Benjamin Hultman, Bryan Matthew, Kemakorn Ithisuphalap, Kate Chen, Yingjie Chen, Jing Xue, Jingyun Wang.

RESEARCH SUPERVISION:

- Postdocs (**5**): Qiurong Shi, Shengwen Liu; Lin Guo, Xiaolin Zhao, Jinhui Zhu
- Ph.D. students (**11**): Shiva Gupta, Hanguang Zhang, Shreya Mukherjee (*female*), Mengjie Chen, Yanghua He (*female*), Zhi Qiao, Hao Zhang, Nadia Mohd Adli (*female*), Jiazhan Li (exchange student from Harbin Institute of Technology), Yi Li (exchange student from Jiangsu University), and Huanhuan Wang (exchange student from Harbin Institute of Technology)
- M.S. students (**21**): Anix Casimir (*African American*), Kuo Ma, Haiyang Shen, Surya Vamsi Devaguptapu, Min Wei, Qing Lan, Shuo Ding, Hengyu Pan, Jingyun Wang (*female*), Jing Xue, Yingjie Chen, Kemakorn Ithisuphalap (*female*), Janel Abbott (*female*), Bryan Matthews; Benjamin Hultman, Kate Chen, Joshua Sokolowski, Vishal Tuli, Bingzhang Zhang, Viswa Phani Marthi, Zimin Wang
- Undergraduate researchers (**17**): Vyomika Sangwan (*female*), Obianuju Joy Obiano (*African American female*), Jing Xue, Hannah Osgood (*female*), Ana Santandreu (*female*), Emmanuel Nsengiyumva (*African American*), Hengyu Pan, Jingyun Wang (*female*), William Kellogg, Daniel Matera, Qinqin Xiao (*female*), Victor Pang, Anna Sviripa (*female*), Ziming Wang (*female*), Dylan Tiffany, Cameron Priest, Jieun Chang (*female*)
- Visiting scholars (**5**): Xiaojuan Wang (*Peking University*); Deyu Li (*Harbin Institute of Technology*); Xiaoxia Wang (*East China University of Science and Technology*); Leilei Lu (Xi;an University of Technology); Qiang Tan (Xi'an Jiaotong University)

GRANT SUPPORT (3 NSF AND 11 DOE PROJECTS):

To date (August 2019), secured more than **$4.2 M** ($4,265,445) *for UB from external federal funding since August 2014 when joining UB. (All of funding listed below are for UB)*

PI of National Science Foundation (NSF) Awards

- "*Collaborative Research: Designing Nitrogen Coordinated Single Atomic Metal Electrocatalysts for Selective CO_2 Reduction to CO*", National Science Foundation (NSF) - CBET-Catalysis-1804326, **$200, 000**, 2018-2021 (***PI***)
- "*Engineering Nanocarbon Air Cathodes for High-Temperature Solid-State Li-O_2 Batteries*",

National Science Foundation (NSF) - CBET-Process & Reaction Engineering-1604392, **$300, 000**, 2016-2020(***PI***); Co-PI: Edward Furlani

- "*Three-dimensional porous nanographene for highly efficient energy storage in Li-ion batteries*", National Science Foundation (NSF) - CBET-Energy Sustainability-1511528, **$300, 000**, 2015-2019 (***PI***); Co-PIs: Chong Cheng and Johannes Hachmann

PI at UB from Department of Energy (DOE)

- *"Mesoporous Carbon based PGM-free Catalyst Cathodes",* U. S. Department of Energy, Energy Efficiency Renewable Energy(EERE) Office, UB funding: **$397,000**, 2019-2021 (PI at UB, led by Indiana University Purdue University)
- *"Stationary Direct Methanol Fuel Cells Using Pure Methanol" ,* U. S. Department of Energy, Energy Efficiency Renewable Energy(EERE) Office, UB funding: **$240,000**, 2019-2022 (PI at UB, led by *University of Kansas*)
- *High-Efficiency Reversible Alkaline Membrane Fuel Cells,* U. S. Department of Energy, Energy Efficiency Renewable Energy(EERE) Office, UB funding: **$150,000**, 2019-2021 (PI at UB, led by *Giner*)
- "*PGM-free OER Catalysts for PEM Electrolyzer"*, U. S. Department of Energy, Energy Efficiency Renewable Energy (EERE) Office, UB funding: **$130,000**, 2018-2020 (PI at UB, led by *Argonne National Laboratory*)
- "*Durable Mn-based PGM-Free Catalysts for Polymer Electrolyte Membrane Fuel Cells*", U. S. Department of Energy, Energy Efficiency Renewable Energy (EERE) Office, UB funding: **$640,000**, 2018-2021 (PI at UB, led by *Giner Inc*)

- "*Advanced PGM-free Cathode Engineering for High Power Density and Durability*", U. S. Department of Energy, Energy Efficiency Renewable Energy(EERE) Office, UB funding: **$528,000**, 2017-2020 (PI at UB, led by *Carnegie Mellon University*)
- "*Low Temperature NH_3 Cracking Membrane Reactor for H_2 Generation*" U. S. Department of Energy, Advanced Research Projects Agency-Energy (APRA-e) Office, UB funding: **$285, 000**, 2017-2020 (*PI at UB, led by Bettergy Corp*).
- "High-Efficiency Ammonia Production from Water and Nitrogen" U. S. Department of Energy, Advanced Research Projects Agency-Energy (APRA-e) Office, UB funding: **$320, 000**, 2017-2020 (*PI at UB, led by Giner Inc.*).
- "Advanced Electrocatalysts through crystallographic enhancement" U. S. Department of Energy, EERE, Fuel Cell Technologies Office, UB funding: **$240, 000**, 2016-2019 (*PI at UB, led by Los Alamos National Laboratory*).
- "*Advanced catalysts and MEAs for reversible alkaline fuel cells*", U. S. Department of Energy, EERE, Fuel Cell Technologies Office, UB funding: **$280, 000**, 2015-2017 (*PI at UB, led by Giner Inc.*)
- "*Nanographene anode for highly efficient energy storage",* Los Alamos National Laboratory, UB funding: **$150, 000**, 2014-2017 (*PI)*.

New York State, SUNY, and UB internal funding

- "*High-efficient ammonia cracking for hydrogen generation*" New York State Energy Research and Development Authority (NYSERDA), **$90,000**, PI at UB, collaborating with Bettergy Corp (Peekskill, NY), 2019-2021.
- Buffalo Blue Sky Golden Award: **$20,000**, University at Buffalo, SUNY, 2018-2020.
- "*Atomic-metal-rich carbon electrocatalysts for sustainable energy via CO_2 reduction*" **$35, 000,** RENEW Award (co-PI); PI: Luis Velarde (CHE), Michel Dupuis (CBE), 2017-2018.
- "*Si Nanocomposite Anode Coated with Lithium-Rich Ferroelectric Layer for High-Performance Lithium-Ion Batteries*", **$35, 000,** SMART Award (co-PI): PI Fei Yao at MDI. 2017-2018.
- "*Engineering graphene tubes as fuel cell supports*", New York State Center of Excellence in Materials Informatics, **$27, 000**, (*PI*), 2016-2017.
- "*3D Printing Flexible Solid-State High-Energy-Density Graphene Supercapacitors*", UB SMART Award **$34,500** (co-PI); PI: Chi Zhou from Industry System Engineering, 2016-2017.
- "*Engineering Photocatalysts for Clean H_2 Generation*" IMPACT Award, **$33,000**, (PI); Co-PIs: Hao Zeng and Peihong Zhang, 2016-2017.
- "*Advanced carbon nanomaterials for supercapacitor energy storage*", SUNY Network of Excellence in Materials and Advanced Manufacturing. **$12,500**, (*PI at UB, led by Stony Brook),* 2015-2016.
- "*Solid-state graphene-based high-performance supercapacitors*", New York State Center of Excellence in Materials Informatics, **$25, 000**, 2015 (*PI*), 2014-2015.

PUBLICATIONS:

*(More than **200** scientific publications in total with >**18,200** citations [Google Scholar], h-index: **66**, (i*10 index: 165*); Google Scholar profile:*
http://scholar.google.com/citations?user=fRf374gAAAAJ&hl=en

- Graduate students or postdocs from my group are marked using **Bold;**
- Undergraduate students are highlighted in **Green;**
- Corresponding authors are marked using **Asterisk (*)**

As the leading author for the papers contributed from my own groups

1. **X. X. Wang,** M. T. Swihart, G. Wu*, Achievements, challenges and perspectives on cathode catalysts in proton exchange membrane fuel cells for transportation, *Nature Catalysis* 2, 578-589, **2019**. (*Invited Review Article for a Special Issue on Catalysis for Transportation*)
2. **Z. Qiao**, S. Hwang, X. Li, C. Wang, W. Samarakoon, S. Karakalos, D. Li, **M. Chen**, **Y. He**, M. Wang, Z. Liu, H. Zhou, G. Wang, Z. Feng, D. Su, J. S. Spendelow, G. Wu*, 3D Porous Graphitic Nanocarbon for Enhancing Performance and Durability of Pt Catalysts: Balance between Graphitization and Hierarchical Porosity, *Energy & Environmental Science*, 12, 2830-2841, **2019**.
3. **M. Chen**, Y. He, J. S. Spendelow, G. Wu*, Atomically Dispersed Metal Catalysts for Oxygen Reduction, *ACS Energy Letters* 4, 1619-1633, **2019**. (*Impact Factor: 16.5; Invited Perspective Article*).

4. **H. Zhang**, H. T. Chung, D. A. Cullen, S. Wagner, U. I. Kramm, K. L. More, P. Zelenay, G. Wu*, High-performance fuel cell cathodes exclusively containing atomically dispersed iron active sites, *Energy & Environmental Science*, 12, 2548-2558, **2019**.
5. **Q. Tan**, C. Y. Shu, **J. Abbott**, Q. Zhao, L. Liu, T. Qu, Y. Chen, H. Zhu, Y. Ni. Liu, G. Wu*, "Highly dispersed Pd-CeO_2 Nanoparticles Supported on N-doped Core-Shell Structured Mesoporous Carbon for Methanol Oxidation in Alkaline Media", *ACS Catalysis* 9, 6362-6371, **2019**.
6. **Y. He**, S. Hwang, D.A. Cullen, M.A. Uddin, L. Langhorst, B. Li, S. Karakalos, A.J. Kropf, E.C. Wegener, **J. Sokolowski**, **M. Chen**, D.J. Myers, D. Su, K.L. More, G. Wang, S. Litster, G. Wu*, Highly active atomically dispersed con4 fuel cell cathode catalysts derived from surfactant-assisted MOFs: Carbon-shell confinement strategy. *Energy & Environmental Science*, 12 (1), 250-260, **2019**.
7. **O**. **Ogoke,** S. Hwang, B. Hultman, M. Chen, S. Karakalos, Y. He, A. Ramsey, D. Su, P. Alexandridis,* G. Wu,* Large-diameter and Heteroatom-doped Graphene Nanotubes Decorated with Transition Metals as Carbon Hosts for Lithium-Sulfur Batteries. *Journal of Materials Chemistry A,* 7, 13389-13399, **2019**.
8. **H. Zhang**, **S. Ding**, S. Hwang, X. Zhao, D. Su, H. Xu, H. Yang, G. Wu*, "Atomically Dispersed Iron Cathode Catalysts Derived from Binary Ligand-Based Zeolitic Imidazolate Frameworks with Enhanced Stability for PEM Fuel Cells ", *J. Electrochem. Soc*. 166, F3116-F3122, **2019**. (*Invited submission to a Focus Issue on Advances in Modern Polymer Electrolyte Fuel Cells in Honor of Shimshon Gottesfeld*.)
9. **Y. He**, Q. Tang, L. Lu, J. Sokolowski, G. Wu*, "Metal-Nitrogen-Carbon Catalysts for Oxygen Reduction in PEM Fuel Cells: Self-Template Synthesis Approach to Enhancing Catalytic Activity and Stability", *Electrochemical Energy Reviews* 2, 231-251, **2019**. (*Invited Review Article*).
10. K. Liu, **Z. Qiao** (co-first author), S. Hwang, Z. Liu, H. Zhang, D. Su, H. Xu, G. Wu*, G. F. Wang*, "Mn-and N-doped Carbon as Promising Catalysts for Oxygen Reduction Reaction: Theoretical Prediction and Experimental Validation", *Appl. Catal. B-Environ.* 243, 195-203, **2019**.
11. **K. Ithisuphalap, H. Zhang, L**. Guo, Q. Yang, H.P. Yang, G. Wu*, Photocatalysis and Photoelectrocatalysis Methods of Nitrogen Reduction for Sustainable Ammonia Synthesis. *Small Methods*, 3(6), 1800352, **2019.** *(Invited submission to a special issue on Nitrogen Reduction Reaction)*
12. **X. X. Wang**, V. Prabhakaran, **Y. He**, Y. Shao, G. Wu*, PGM- and Iron-free Cathode Catalysts for Proton Exchange Membrane Fuel Cells: Cobalt Catalysts and Peroxide Mitigation Approach, *Advanced Materials*, 31, 1805126, **2019**. *(Invited submission for a special issue on Electrochemical Energy Materials)*
13. **J. Li, M. Chen**, D. A. Cullen, S. Hwang, M. Wang, B. Li, K. Liu, S. Karakalos, M. Lucero, **H.G. Zhang**, C. Lei, H. Xu, G. E. Sterbinsky, Z. Feng, D. Su, K. L. More, G.F. Wang, Z. Wang G Wu*, Atomically Dispersed Manganese Catalysts for Oxygen Reduction in Proton Exchange Membrane Fuel Cells, *Nature Catalysis*, 1, 935-945, **2018**.
14. **M. Chen**, S. Hwang, S. Karakalos, **K. Chen, Y. He, S. Mukherjee**, D. Su, G. Wu*, Pt-M Alloy Nanoparticles Decorated on Large-Size Nitrogen-Doped Graphene Tubes for Highly Stable Oxygen-Reduction Catalysts, *Nanoscale*, 10, 17318-17326, **2018**.
15. **H. Zhang, J. Li**, Q. Tan, L, Lei, Z. Wang, G. Wu*, Metal-Organic Frameworks and Their Derived Materials as Electrocatalysts and Photocatalysts for CO_2 Reduction: Progress,

Challenge, and Perspective, *Chemistry – A European Journal,* 24, 18137-18157, **2018**. (*Invited Perspective Article for a Special Issue on Renewable Energy*)

16. **N. Mohd-Adli**, H. Zhang, S. Mukerjee, G. Wu* Ammonia Oxidation Electrocatalysis for Hydrogen Generation and Fuel Cells, *Journal of the Electrochemcial Society*, 165, J3130-J3147, **2018**. (*Invited submission to a Focus Issue on Electrocatalysis -- In Honor of Dr. Radoslav Adzic*)
17. **X. X. Wang**, S. Hwang, Y. T. Pan, **K. Chen**, Y. He, S. G. Karakalos, H. Zhang, J. S. Spendelow, D. Su, G. Wu*, Ordered Pt_3Co Intermetallic Nanoparticles Derived from Metal-organic Frameworks for Oxygen Reduction, *Nano Lett*. 18(7), 4163-4171, **2018**.
18. **S. Mukherjee**, D. A. Cullen, S. Karakalos, K. Liu, **H. Zhang**, S. Zhao, H. Xu, K. L. More, G. F. Wang, G. Wu*. Metal-organic framework-derived nitrogen-doped highly disordered carbon for electrochemical ammonia synthesis using N_2 and H_2O in alkaline electrolytes. *Nano Energy***,** *48*, 217-226, **2018**.
19. F. Pan, H. Zhang (co-first author), K. Liu, D. A. Cullen, K. L. More, M. Wang, Z. Feng, G. Wang, G. Wu*, Y. Li* Unveiling Active Sites of CO_2 Reduction on Nitrogen Coordinated and Atomically Dispersed Iron and Cobalt Catalysts. *ACS Catalysis, 8,* 3116–3122, **2018**.
20. **X. X. Wang,** D. A. Cullen, Y. T. Pan, S. Hwang, M. Wang, Z. Feng, **J. Wang**, M. H. Engelhard, H. Zhang, Y. He, Y. Shao, D. Su, K. L. More, J. S. Spendelow, G. Wu*, Nitrogen Coordinated Single Cobalt Atom Catalysts for Oxygen Reduction in Proton Exchange Membrane Fuel Cells, *Advanced Materials*, 30, 1706758, **2018**. (*One of The Most Cited Paper in Advanced Materials published in 2018.*)
21. **He, Y.; Matthews**, B.; Wang, X. X.; **Wang, J**. and Wu, G.*, Innovation and Challenges in Materials Design for Flexible Rechargeable Batteries: from One-dimensional to Three-dimensional, *Journal of Materials Chemistry A*, 6, 735-753, **2018**. (*Journal of Materials Chemistry A HOT Papers in 2018*)
22. **S. Mukherjee, S. Devaguptapu, A. Sviripa,** C. R. Lund, G. Wu,* Low-Temperature Ammonia Decomposition Catalysts for Hydrogen Generation, *Applied Catalysis B: Environmental*, 226, 162-181, **2018**.
23. **M. Chen,** L. Wang, H. Yang, S. Zhao, H. Xu, G. Wu,* Nanocarbon/oxide composite catalysts for bifunctional oxygen reduction and evolution in reversible alkaline fuel cells: a mini review, *Journal of Power Sources,* 375, 277-290*,* **2018**. (*Invited submission to a Special Issue on Alkaline Membrane Fuel Cells: State-of-the-Art and Remaining Challenges*)
24. **S. Devaguptapu,** S. Hwang, S. Zhao, S. Karakalos, H. Xu, **S. Gupta,** D. Su, G. Wu,* Morphology Dependent Performance of Carbon-free Spinel $NiCo_2O_4$ Catalysts for Bifunctional Oxygen Reduction and Evolution in Alkaline Media, *ACS Applied Materials and Interface*, 9, 44567–44578, **2017**.
25. **M. Wei,** L. Qiao, **K. Ma,** S. Karakalos, H. Zhang, Z. Fu, M. S. Swihart, G. Wu,* Engineering Reduced Graphene Oxides with Enhanced Electrochemical Properties through Multiple-Step Reduction, *Electrochimica Acta*, 258, 735-743, **2017**.
26. **S. Gupta**, S. Zhao, X. Wang, S. Hwang, S. Karakalos, S. Devaguptapu, S. Mukherjee, D. Su, H. Xu, G. Wu.*, FeCoNiMn-based nanocarbon electrocatalysts for bifunctional oxygen reduction and evolution: promotional role of Mn doping in stabilizing carbon, *ACS Catalysis* 7, 8386–8393, **2017**.
27. **Zhang, H**.; Hwang, S.; Wang, M.; Feng, Z.; Karakalos, S.; Luo, L.; **Qiao, Z**.; Xie, X.; Wang, C.; Su, D.; Shao, Y.; Wu, G.*, Single Atomic Iron Catalysts for Oxygen Reduction in Acidic Media: Particle Size Control and Thermal Activation, *Journal of the American Chemical Society*, 139, 14143-14149, **2017**.

28. **Zhang, F**.; **Wei, M**.; Shao, Y.; Wu, G.*; Zhou, C.*, 3D Printing Technologies for Electrochemical Energy Storage. *Nano Energy*, 40, 418-431, **2017**.
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Contributions to Book Charters

- Wang T., Li Q.,* Wu G.*, "Heteroatom-Doped, Carbon-Supported Metal Catalysts for Electrochemical Energy Conversions" for "*Carbon-Based Metal-Free Catalysts: Design and Applications*", Editors: Liming Dai, *John Wiley & Sons, Inc*., 2018.
- Wu G*., Xu P., "Graphene Composite Catalysts for Electrochemical Energy Conversion" for "Multifunctional Nanocomposites for Energy and Environmental Applications", Editors: Zhanhu Guo, Yuan Chen, Na Luna Lu, *John Wiley & Sons, Inc*., 2018.

- Chung H., Wu G., Higgins D., Zamani P., Chen Z., and Zelenay P*. "Heat-Treated Non-precious Metal Catalysts for Oxygen Reduction "for Electrochemistry of N4 Macrocyclic Metal Complexes, Volume 1: Energy, Editors: J. H. Zagal, F. Bedioui, Springer, 2016.
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- Wu G*, Chen Z; Zhang JJ, "Nanostructured transition metal-N-C catalysts for oxygen reduction in PEM fuel cells" for *Nanostructured and Advanced Materials in Fuel Cells*, Editor: San-Ping Jiang and Peikang Shen, *CRC Press*, 2013.
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PATENTS & PATENT APPLICATIONS:

- "Catalytic Oxidation of Dimethyl Ether", US Patent App. 13/840,831.
- "Nitrogen-doped carbon-supported cobalt-iron oxygen reduction catalyst", U.S. Application Serial No. 13/094,594
- "Preparation of supported electrocatalysts comprising multiwalled carbon nanotubes", U.S. Application Serial No. 61/333,667
- "Non-precious fuel cell catalysts comprising polyaniline", U.S. Application Serial No. 13/267,579
- "Carbon-based composite electrocatalysts for low temperature fuel cells", U.S. Patent 7629285

INVITED TALKS AND PRESENTATIONS

More than 100 presentations (more than 50 invited talks) in international, national conferences (*e.g.*, ECS, ACS, AIChE, MRS) and universities' seminars.

Invited seminar talks at universities and DOE national labs

1. Wu G., Advanced cathode catalysts in proton exchange membrane fuel cells, *Clemson University, Department of Materials Science and Engineering*, invited department seminar, September 19th, 2019.

2. Wu G., Achievements, challenges and perspectives on cathode catalysts in proton exchange membrane fuel cells, *University of Illinois at Chicago, Department of Chemical Engineering*, invited department seminar, November 7th, 2019.
3. Wu G., Atomically Dispersed Metal Site Catalysts for Oxygen Reduction, *University of Houston, Department of Physics*, invited department seminar, November 19th, 2019.
4. Wu G., Atomically Dispersed Metal Site Catalysts for Proton Exchange Membrane Fuel Cells, *Pittsburgh-Cleveland Catalysis Society (PCCS) meeting at the University of Pittsburgh*, August 22, 2019.
5. Wu G., PGM-free catalysts for hydrogen fuel cells, *University of South Carolina, Department of Chemical Engineering*, invited department seminar, February 21, 2019.
6. Wu G., Single metal site electrocatalysis for sustainable energy conversion, *Rensselaer Polytechnic Institute, Department of Chemistry*, invited department seminar, March 12, 2019.
7. Wu G., Atomically dispersed metal sites catalysts for sustainable energy conversion, *University of Florida, Department of Chemical Engineering*, invited department seminar, December 11, 2018.
8. Wu G., Advanced PGM-free cathode catalysts for hydrogen fuel cells, *2018 Electrochemical Energy Symposium at Carnegie Mellon University Wilton E. Scott Institute for Energy Innovation*, November 15, 2018.
9. Wu G., Advanced cathode catalysts for hydrogen fuel cells, *Pacific Northwest National Laboratory*, invited division seminar, May 30, 2018.
10. Wu G., PGM-free catalysts for electrochemical energy conversion through water reactions, *Renewable Energy National Laboratory*, invited division seminar, Feb 13, 2018.
11. Wu G, Atomic metal site catalyst for energy conversion, *Florida International University – Department of Mechanical and Materials Engineering*, December 1st, 2017.
12. Wu G. Large-size Graphene Tube Catalysts for Sustainable Electrochemical Energy Storage and Conversion, *Binghamton University, Department of Chemistry*, February 2016.
13. Wu G. Carbon nanocomposite catalysts for Sustainable Electrochemical Energy Storage and Conversion, *Cornell University, Department of Materials Science and Engineering*, March 2016.
14. Wu G. Bifunctional carbon nanocomposite catalysts for Sustainable Electrochemical Energy Conversion, *University of Missouri-Columbia, Department of Chemical Engineering*, March 2016.

Invited talks in national and international conferences and workshops

15. Wu G., Advanced atomically dispersed metal catalysts for fuel cells, ACS Fall 2019 National Meeting & Exposition in San Diego, CA, August 25 - 29, 2019.
16. Wu G., Discussion on the formation mechanisams of Fe-N4 active sites during the thermal activation, Telluride Science Workshop: PGM-free Catalysis for fuel cell application, Telluride, CO, June 24-29, 2019

17. Wu G., Polymer Hydrogel-Derived Carbon Supports for Highly Stable Pt/C Cathode Catalysts in PEM Fuel Cells, 235th Electrochemical Society Meeting, Dallas, TX, May 28, 2019
18. Wu G., Metal-Organic Framework-Derived Carbon Electrocatalysts for Nitrogen Reduction, 235th Electrochemical Society Meeting, Dallas, TX, May 28, 2019
19. Wu G., Advanced Atomically Dispersed Metal Cathode Catalysts for Hydrogen Fuel Cells, 235th Electrochemical Society Meeting, Dallas, TX, May 28, 2019
20. Wu G., Highly Stable Carbon-Based Catalysts for Bifunctional Oxygen Reduction and Evolution for Reversible Alkaline Fuel Cells, 2019 Spring Material Research Society meeting, Phoenix, AZ, April 23, 2019.
21. :Wu G., MOF-Dervied Atomically Dispersed Metal Site Cathode Catalysts for Proton Exchange Membrane Fuel Cells, 2019 Spring Material Research Society meeting, Phoenix, AZ, April 23, 2019.
22. Wu G., Atomically Dispersed and Nitrogen Coordinated Metal Site Catalysts for Oxygen Reduction in Acids, 2018 AIChE Fall meeting, Pittsburgh, PA, October 30, 2018.
23. Wu G., Advances Cathodes for Future Hydrogen Fuel Cells, 2018 International Roundtable of NanoScience and NanoTechnology, Shanghai University, September 25 2018.
24. Wu G., PGM-Free Bifunctional Electrocatalyst for Oxygen Reduction and Evolution Reactions in Reversible Alkaline Fuel Cells, 234th Electrochemical Society Meeting, October 2, 2018.
25. Wu G., High-Performance PGM-Free and Fe-Free Catalysts for Oxygen Reduction in Acidic Media, 233th Electrochemical Society Meeting, Seattle, WA, May 28, 2018
26. Wu G., Size-Controlled Carbon Catalysts Derived from Metal-Organic Frameworks for Non-Aqueous Li-Air Battery, 233th Electrochemical Society Meeting, Seattle, WA, May 28, 2018.
27. Wu G., Active Carbon Supports for Pt Cathode Catalysts in PEM Fuel Cells, 233th Electrochemical Society Meeting, Seattle, WA, May 28, 2018.
28. Wu G., PGM-Free and Iron-Free Catalysts for Oxygen Reduction in Acids, 234th Electrochemical Society Meeting, Cancun, Mexico, Oct 1, 2018
29. Wu G., Nitrogen-Doped Highly Disordered Carbon for Nitrogen Reduction Reaction during Electrochemical Ammonia Synthesis, 234th Electrochemical Society Meeting, Cancun, Mexico, Oct 1, 2018
30. Wu G., Size-Tunable Atomic Iron Catalysts Derived from Metal-Organic Framework for Oxygen Reduction in Acid Media, 233th Electrochemical Society Meeting, Seattle, WA, May 28, 2018.
31. Wu G., Atomically dispersed iron catalysts for oxygen reduction in acids，256th National Meeting and Exposition of the American-Chemical-Society (ACS) - Boston, MA Date: AUG 19-23, 2018。
32. Wu G., Highly disordered carbon for electrochemical ammonia synthesis using N_2 and H_2O in alkaline electrolytes， 256th National Meeting and Exposition of the American-Chemical-Society (ACS) Boston, MA Date: AUG 19-23, 2018

33. Wu G., Fully ordered Pt3Co intermetallic nanoparticles derived from metal-organic framework for oxygen reduction， 256th National Meeting and Exposition of the American-Chemical-Society (ACS) - Boston, MA Date: AUG 19-23, 2018.
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