

Jing Qi, Ph.D.

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Professional Summary

- ✓ Expertise in design, synthesis and characterization of nanomaterials for electrocatalysis
- ✓ Expertise in electrochemical techniques
- ✓ Expertise in design, testing, and analysis of fuel cells (direct methanol fuel cells, proton exchange membrane fuel cells, and anion-exchange membrane fuel cells) and flow batteries
- ✓ Excellent academic background and exceptional scientific training in several prestigious research institutions
- ✓ Served as a critic for other individuals' work, which requires outstanding achievements
- ✓ Impressive publication record with numerous worldwide citations (1534 citations according to Google Scholar, Hirsch index = 16)

Education

Ph.D., Physical Chemistry Sep. 2007–Oct. 2011

Dalian Institute of Chemical Physics

Chinese Academy of Sciences

Dissertation: “Studies on Electrocatalysts and Novel Carbon Supports for Direct Methanol Fuel Cells”

Supervisor: Prof. Gongquan Sun

- ✧ Developed an innovative method to prepare low-cost non-Pt electrocatalysts
- ✧ Developed an innovative method for large-scale and economical production of graphitic mesoporous carbons
- ✧ Offered molecular-level insights into the relationship between the structure of electrocatalysts and their catalytic activity
- ✧ Achieved a significant stability improvement of fuel cells by applying the highly graphitic mesoporous carbons supported electrocatalysts
- ✧ Developed a simple and efficient treatment method for carbon support to improve the graphitization degree and optimize the pore structure which could be used as promising carbon supports for electrocatalysts

M.S., Physical Chemistry Sep. 2003–Jul. 2006

Harbin Normal University

Dalian Institute of Chemical Physics Chinese Academy of Sciences

Dissertation: “Studies on Carbon Supported Catalysts for Direct Methanol Fuel Cells”

Supervisor: Prof. Ying Gao and Prof. Gongquan Sun

- ✧ Synthesized well-dispersed Pt-based electrocatalysts with controllable nano-particle size
- ✧ Characterized electrocatalysts for their activities toward the methanol oxidation reaction and the oxygen reduction reaction

B.S., Chemistry Education Sep. 1999–Jul. 2003

Harbin Normal University

Work Experience

Junior Researcher Mar. 2019–Present

Hawaii Natural Energy Institute

School of Ocean and Earth Science and Technology

University of Hawaii – Manoa

Project: “Asia Pacific Research Initiative for Sustainable Energy Systems (APRISES)” funded by Office of Naval Research (ONR)

Supervisor: Dr. Jean St-Pierre

- ✧ Developed synthesis techniques for efficient and durable transition metal carbide catalysts for fuel cells, water electrolyzers, and flow batteries

Post-Doctoral Fellow

Jul. 2015–Feb. 2019

Hawaii Natural Energy Institute

School of Ocean and Earth Science and Technology

University of Hawaii – Manoa

Project: “Asia Pacific Research Initiative for Sustainable Energy Systems (APRISES)” funded by Office of Naval Research (ONR)

Supervisor: Dr. Jean St-Pierre

- ✧ Investigated the impacts of vanadium salt grades and cost on flow battery reactions with a rotating ring/disk electrode
- ✧ Conducted airborne contaminant mixtures long duration tests on fuel cells with low Pt loading to understand contamination mechanisms with advanced diagnostics
- ✧ Studied the effects of contaminants released from fuel cell system components

Project: “The Effect of Airborne Contaminants on Fuel Cell Performance and Durability” funded by Department of Energy (DOE)

Supervisor: Dr. Jean St-Pierre

- ✧ Identified and mitigated the adverse effects of airborne contaminants on fuel cell system performance and durability
- ✧ Provided contaminants and tolerance limits for filter specifications

Post-Doctoral Fellow

Jan. 2014–Jun. 2015

Richard G. Lugar Center for Renewable Energy

Department of Engineering Technology

Indiana University Purdue University Indianapolis

Project: “Electricity from Bio-Ethanol Powered Fuel Cells” funded by National Science Foundation (NSF)

Supervisor: Prof. Rongrong Chen

- ✧ Developed methods of preparing Pd-based electrocatalysts with high activity toward the ethanol oxidation reaction in alkaline media
- ✧ Optimized membrane/electrode assembly (MEA) structures to improve the performance of anion-exchange membrane fuel cells
- ✧ Studied degradation mechanisms and impurity tolerance of anion-exchange membrane fuel cells using bio-fuels

Post-Doctoral Fellow

Dec. 2011–Dec. 2013

Center for Clean Energy Engineering

Department of Mechanical Engineering

University of Connecticut

Project: “The Effect of Airborne Contaminants on Fuel Cell Performance and Durability” funded by Department of Energy (DOE)

Supervisor: Prof. Ugur Pasaogullari and Research Scientist Leonard J. Bonville

- ✧ Investigated the effects and mechanisms of cationic contaminants on fuel cell performance
- ✧ Led and trained a group of students including scheduling, cell assembly, cell testing, post-test analysis, and technical report preparation tasks

Project: “Developing the Hydrogen Separation, Purification, and Pumping System for Fuel Cells” funded by Fuel Cell Energy, Inc.

Supervisor: Prof. Ugur Pasaogullari and Research Scientist Leonard J. Bonville

- ✧ Developed and demonstrated a novel way to electrochemically separate carbon monoxide from a reformat stream to generate hydrogen with low cost and high purity
- ✧ Collaborated with research partners, participated in weekly telephone conferences, prepared weekly and yearly reports, and guided students

Research Assistant

Aug. 2006–Aug. 2007

Dalian Institute of Chemical Physics

Chinese Academy of Sciences

Supervisor: Prof. Gongquan Sun

- ✧ Investigated modification methods for carbon supports to improve the activity and stability of electrocatalysts

Peer Reviewer

2014–Present

- ✧ Active reviewer for prestigious scientific journals including Applied Catalysis B: Environmental, Carbon, Chemical Engineering Journal, Catalysis Communications, Electrochimica Acta, International Journal of Hydrogen Energy, Energies, Energy & Fuels, Journal of Power Sources, and Journal of The Electrochemical Society

Patents

- [1] Gongquan Sun, **Jing Qi**, Luhua Jiang, A kind of M/N-C catalyst and its preparation and application, Chinese patent 201010522823.2
- [2] Gongquan Sun, **Jing Qi**, Mingyuan Zhu, Qian Jiang, Mingyi Jing, A method for synthesis of mesoporous carbon, Chinese patent 200910012463.9

Publications

- [1] **Jing Qi**, Yunfeng Zhai, Jean St-Pierre, Effect of contaminant mixtures in air on proton exchange membrane fuel cell performance, J. Power Sources, 413 (2019) 86–97.
- [2] **Jing Qi**, Junjie Ge, Md Aman Uddin, Yunfeng Zhai, Ugur Pasaogullari, Jean St-Pierre, Evaluation of cathode contamination with Ca^{2+} in proton exchange membrane fuel cells, Electrochim. Acta., 259 (2018) 510–516.
- [3] Yunfeng Zhai, Junjie Ge, **Jing Qi**, Jean St-Pierre, Effect of acetonitrile contamination on long-term degradation of proton exchange membrane fuel cells, J. Electrochem. Soc., 165 (2018) F3191–F3199.
- [4] **Jing Qi**, Yunfeng Zhai, Jean St-Pierre, Effects of ethylene glycol and caprolactam on the ORR and HOR performances of Pt/C catalysts, J. Electrochem. Soc., 163 (2016) F1618–F1626.
- [5] Md Aman Uddin, **Jing Qi**, Xiaofeng Wang, Ugur Pasaogullari, Leonard Bonville, Distributed cation contamination from cathode to anode direction in polymer electrolyte fuel cells, Int. J. Hydrogen Energy, 40 (2015) 13099–13105.
- [6] **Jing Qi**, Xiaofeng Wang, M. Ozan Ozdemir, Md. Aman Uddin, Leonard Bonville, Ugur Pasaogullari, Trent Molter, Effect of cationic contaminants on polymer electrolyte fuel cell performance. J. Power Sources, 286 (2015) 18–24.
- [7] Md Aman Uddin, Xiaofeng Wang, **Jing Qi**, M. Ozan Ozdemir, Ugur Pasaogullari, Leonard Bonville, Trent Molter, Effect of chloride on PEFCs in presence of various cations, J. Electrochem. Soc., 162 (2015) F373–F379.
- [8] Xiaofeng Wang, **Jing Qi**, Ozan Ozdemir, Aman Uddin, Ugur Pasaogullari, Leonard J. Bonville, Trent Molter, Ca^{2+} as an air impurity in polymer electrolyte membrane fuel cells, J. Electrochem. Soc., 161 (2014) F1006–F1014.
- [9] **Jing Qi**, Xiaofeng Wang, Ugur Pasaogullari, Leonard Bonville, Trent Molter, Effect of Al^{3+} contaminant on polymer electrolyte fuel cell performance, J. Electrochem. Soc., 160 (2013) F916–F922.

- [10] **Jing Qi**, Luhua Jiang, Qiwen Tang, Shan Zhu, Suli Wang, Baolian Yi, Gongquan Sun, Synthesis of graphitic mesoporous carbons with different surface areas and their use in direct methanol fuel cells, *Carbon*, 50 (2012) 2824–2831.
- [11] **Jing Qi**, Luhua Jiang, Mingyi Jing, Qiwen Tang, Gongquan Sun, Preparation of Pt/C via a polyol process – Investigation on carbon support adding sequence. *Int. J. Hydrogen Energy*, 36 (2011) 10490–10501.
- [12] **Jing Qi**, Luhua Jiang, Suli Wang, Gongquan Sun, Synthesis of graphitic mesoporous carbons with high surface areas and their applications in direct methanol fuel cells, *Appl. Catal. B: Environ.*, 107 (2011) 95–103.
- [13] Qiwen Tang, Luhua Jiang, **Jing Qi**, Qian Jiang, Suli Wang, Gongquan Sun, One step synthesis of carbon-supported Ag/Mn_yO_x composites for oxygen reduction reaction in alkaline media, *Appl. Catal. B: Environ.*, 104 (2011) 337–345.
- [14] Qian Jiang, Luhua Jiang, **Jing Qi**, Suli Wang, Gongquan Sun, Experimental and density functional theory studies on PtPb/C bimetallic electrocatalysts for methanol electrooxidation reaction in alkaline media, *Electrochim. Acta*, 56 (2011) 6431–6440.
- [15] Dehui Deng, Xiulian Pan, Liang Yu, Yi Cui, Yeping Jiang, **Jing Qi**, Wei-Xue Li, Qiang Fu, Xucun Ma, Qikun Xue, Gongquan Sun, Xinhe Bao, Toward N-doped graphene via solvothermal synthesis, *Chem. Mater.*, 23 (2011) 1188–1193.
- [16] **Jing Qi**, Shiyu Yan, Qian Jiang, Ying Liu, Gongquan Sun, Improving the activity and stability of a Pt/C electrocatalyst for direct methanol fuel cells, *Carbon*, 48 (2010) 163–169.
- [17] **Jing Qi**, Luhua Jiang, Qian Jiang, Suli Wang, Gongquan Sun, Theoretical and experimental studies on the relationship between the structures of molybdenum nitrides and their catalytic activities toward the oxygen reduction reaction, *J. Phys. Chem. C*, 114 (2010) 18159–18166.
- [18] Shuihua Tang, Gongquan Sun, **Jing Qi**, Shiguo Sun, Junsong Guo, Qin Xin, Geir Martin Haarberg, Review of new carbon materials as catalyst supports in direct alcohol fuel cells, *Chin. J. Catal. (English)*, 31 (2010) 12–17.
- [19] Shuihua Tang, Gongquan Sun, Shiguo Sun, **Jing Qi**, Qin Xin, Geir Martin Haarberg, Double-walled carbon nanotubes as catalyst support in direct methanol fuel cells, *J. Electrochem. Soc.*, 157 (2010) B1321–B1325.
- [20] Qian Jiang, Luhua Jiang, Hongying Hou, **Jing Qi**, Suli Wang, Gongquan Sun, Promoting effect of Ni in PtNi bimetallic electrocatalysts for the methanol oxidation reaction in alkaline media: experimental and density functional theory studies, *J. Phys. Chem. C*, 114 (2010) 19714–19722.
- [21] Qian Jiang, Luhua Jiang, Suli Wang, **Jing Qi**, Gongquan Sun, A highly active PtNi/C electrocatalyst for methanol electro-oxidation in alkaline media, *Catal. Commun.*, 12 (2010) 67–70.
- [22] Shiyu Yan, Gongquan Sun, **Jing Qi**, Yan Gao, Qin Xin, Effect of heat treatment on the PtRu/C electrocatalyst prepared by the polyol method, *Chin. J. Catal. (Chinese)*, 30 (2009) 1109–1113.
- [23] Ying Liu, Hong Zhao, Shiyu Yan, **Jing Qi**, Gongquan Sun, Preparation and characterization of methanol tolerant Pd-Co/C electrocatalysts for direct methanol fuel cells, *Chin. J. Catal. (Chinese)*, 30 (2009) 1012–1016.
- [24] Junsong Guo, Gongquan Sun, Shiguo Sun, Shiyu Yan, Weiqian Yang, **Jing Qi**, Yushan Yan, Qin Xin, Polyol-synthesized PtRu/C and PtRu black for direct methanol fuel cells, *J. Power Sources*, 168 (2007) 299–306.
- [25] **Jing Qi**, Ying Gao, Shuihua Tang, Luhua Jiang, Shiyu Yan, Junsong Guo, Qin Xin, Gongquan Sun, Synthesis and characterization of carbon nanoribbons as electrocatalyst supports for direct methanol fuel cells, *Chin. J. Catal. (English)*, 27 (2006) 708–712.
- [26] Shiyu Yan, Gongquan Sun, Juan Tian, Luhua Jiang, **Jing Qi**, Qin Xin, Polyol synthesis of highly active PtRu/C catalyst with high metal loading, *Electrochim. Acta*, 52 (2006) 1692–1696.

Conference Proceedings

- [1] **Jing Qi**, Jean St-Pierre, Akari Hayashi, Synthesis and characterization of carbide catalysts supported on carbide supports, Kyushu University Energy Week 2019 poster presentation, Fukuoka, Japan, Jan. 28–Feb. 1, 2019.
- [2] **Jing Qi**, Jean St-Pierre, Akari Hayashi, Synthesis and characterization of carbide catalysts supported on carbide supports, Kyushu University Energy Week 2018 poster presentation, Fukuoka, Japan, Jan. 29–Feb. 2, 2018.
- [3] **Jing Qi**, Junjie Ge, Md Aman Uddin, Yunfeng Zhai, Ugur Pasaogullari, Jean St-Pierre, Ca²⁺ Effects on a Pt/C Catalyst for the Oxygen Reduction Reaction, 232th Electrochemical Society meeting oral presentation, abstract 1567, National Harbor, MD, Oct. 1–5, 2017.
- [4] **Jing Qi**, Yunfeng Zhai, Jean St-Pierre, RRDE Analysis of Ethylene Glycol and Caprolactam Contaminants on ORR and HOR, 230th Electrochemical Society meeting oral presentation, abstract 2523, Honolulu, HI, Oct. 2–7, 2016.
- [5] Rongrong Chen, **Jing Qi**, Tolerance of impurities in bio-ethanol on Pd/C catalyst toward the ethanol oxidation reaction in alkaline media, 226th Electrochemical Society meeting poster presentation, abstract 1179, Cancun, Mexico, Oct. 5–9, 2014.
- [6] Md Aman Uddin, Jaehyung Park, Xiaofeng Wang, **Jing Qi**, Ugur Pasaogullari, Leonard Bonville, Trent Molter, The role of gas diffusion layer in cationic contamination and mitigation in polymer electrolyte fuel cells, *Electrochem. Soc. Trans.*, 64 (3) (2014) 537–544.
- [7] Md Aman Uddin, Xiaofeng Wang, M. Ozan Ozdemir, **Jing Qi**, Leonard Bonville, Ugur Pasaogullari, Trent Molter, Distributed PEFC Performance during cationic contamination, *Electrochem. Soc. Trans.*, 61 (12) (2014) 49–55.
- [8] **Jing Qi**, Xiaofeng Wang, M. Ozan Ozdemir, Md Aman Uddin, Leonard Bonville, Ugur Pasaogullari, Trent Molter, Effect of cationic contaminants on polymer electrolyte fuel cell performance, *Electrochem. Soc. Trans.*, 58 (1) (2013) 537–542.
- [9] **Jing Qi**, Xiaofeng Wang, M. Ozan Ozdemir, Md Aman Uddin, Leonard Bonville, Ugur Pasaogullari, Trent Molter, Effect of cationic contaminants on PEFC performance, 224th Electrochemical Society meeting oral presentation, abstract 1333, San Francisco, CA, Oct. 27–Nov 1, 2013.
- [10] Xiaofeng Wang, **Jing Qi**, Ozan Ozdemir, Ugur Pasaogullari, Leonard J. Bonville, Trent Molter, Effects of Ca²⁺ as an air impurity on polymer electrolyte fuel cells, *Electrochem. Soc. Trans.*, 58 (1) (2013) 529–536.
- [11] Md Aman Uddin, Xiaofeng Wang, **Jing Qi**, M Ozan Ozdemir, Leonard J. Bonville, Ugur Pasaogullari, Trent Molter, Effects of chloride contamination on PEFCs, *Electrochem. Soc. Trans.*, 58 (1) (2013) 543–553.
- [12] **Jing Qi**, Xiaofeng Wang, Ugur Pasaogullari, Leonard J. Bonville, Trent Molter, Effect of cationic contaminants on polymer electrolyte fuel cell performance, *Electrochem. Soc. Trans.*, 50(2) (2012) 671–678.
- [13] **Jing Qi**, Xiaofeng Wang, Ugur Pasaogullari, Leonard J. Bonville, Trent Molter, Effect of cationic contaminants on PEFC performance, 222nd Electrochemical Society meeting oral presentation, abstract 1300, Honolulu, HI, Oct. 7–12, 2012.
- [14] Shuihua Tang, Gongquan Sun, Shiguo Sun, **Jing Qi**, Qin Xin, Geir Martin Haarberg, Double-walled carbon nanotubes as an electrode for direct methanol fuel cell applications, *Electrochem. Soc. Trans.*, 16 (50) (2009) 113–122.

Major Awards

- ✓ 2011 Tang Aqing chemistry scholarship for outstanding Ph.D. candidate
- ✓ 2011 Procter & Gamble scholarship for excellent Ph.D. candidate
- ✓ 2010 DICP-Corning graduate student scholarship award
- ✓ 2009/2010 “Merit student and outstanding student Cadre of Chinese Academy of Sciences” award
- ✓ 2006 Second prize master scholarship of Harbin Normal University
- ✓ 2003 “Outstanding graduate of Harbin Normal University” award

- ✓ 1999–2003 Coca-Cola scholarship for first generation country college student
- ✓ 2001 First prize scholarship of Harbin Normal University
- ✓ 2001 “Professional study example of Harbin Normal University” award
- ✓ 2000 First prize scholarship of Harbin Normal University
- ✓ 2000 “Merit student of Harbin Normal University” award