

Qi Lu

Associate Professor of Chemical Engineering, Tsinghua University

luqicheme@tsinghua.edu.cn • Tel: +86-10-62795294 • Fax: +86-10-62770304

PROFESSIONAL EXPERIENCE

Associate Professor, Department of Chemical Engineering, Tsinghua University	Mar. 2016 – present
Assistant Professor, Department of Chemical Engineering, Tsinghua University	Feb. 2016 – Mar. 2019
Postdoctoral Fellow (joint), Department of Chemical Engineering, Columbia University	Sept. 2013 – Jan. 2016
Postdoctoral Fellow, Department of Chemical and Biomolecular Engineering, University of Delaware	Feb. 2012 – Jan. 2016
Lecturer, Department of Physics and Astronomy, University of Delaware	Jun. 2008 – July. 2012

EDUCATION

Ph.D., Physics, University of Delaware, Feb. 2012

B.E., Material Science and Engineering, Zhejiang University, China, Jun. 2005

RESEARCH INTERESTS

Nanostructured electrocatalysts for converting CO₂, CH₄ and H₂O to value-added, energy dense products
In situ spectroscopy study of nanomaterials syntheses and electrochemical reactions in energy application
Rational design of advanced materials and nanostructures for energy storage: battery and supercapacitor
Interactions of external electrical and magnetic field to electrochemical reactions for energy application

RESEARCH PAPERS (PUBLISHED OR ACCEPTED)

- 1 Jiao J.#, Lin R.#, Liu S.#, Cheong W.-C.#, Zhang C., Chen Z., Pan Y., Tang J., Wu K., Hung S.-F., Chen H. M., Zheng L., **Lu Q.**, Yang X., Xu B., Xiao H.*, Li J., Wang D., Peng Q., Chen C.*, Li Y., “[Copper Atom-pair Catalyst Anchored on Alloy Nanowires for Selective and Efficient Electrochemical Reduction of CO₂](#)”, *Nature Chemistry*, 11, 222-228 (2019) (#contributed equally to this work)
- 2 Zhang H.#, Li J.#, Cheng M.*, and **Lu Q.***, “[CO Electroreduction: Current Development and Understanding of Cu-Based Catalyst](#)”, *ACS Catalysis*, 9(1), 49-65 (2019) (#contributed equally to this work)

- 3 Luan C., Shao Y.*, **Lu Q.***, Gao S., Huang K., Wu H.*, Yao K., “[High Performance Carbon Dioxide Electrocatalytic Reduction by Easily-Fabricated Large Scale Silver Nanowire Arrays](#)”, *ACS Applied Materials & Interfaces*, 10 (21), 17950-17956 (2018)
- 4 Liu B., Zhang H., **Lu Q.**, Li G.* and Zhang F.*, “[A Cu-Ni Bimetallic Cathode with Nanostructured Copper Array for Enhanced Hydrodechlorination of Trichloroethylene \(TCE\)](#)”, *Science of the Total Environment*, 635, 1417–1425 (2018)
- 5 Pan Y., Lin R., Chen Y., Liu S., Zhu W., Cao X., Chen W., Wu K., Cheong W., Wang Y., Zheng L., Lou J., Lin Y., Liu Y., Liu, C., Li J., **Lu Q.**, Chen X., Wang D., Peng Q., Chen C.*, Li Y., “[Design of Single-Atom Co-N5 Catalytic Site: A Robust Electrocatalyst for CO₂ Reduction with Nearly 100% CO Selectivity and Remarkable Stability](#)”, *Journal of the American Chemical Society*, 140 (12), 4218-4221 (2018)
- 6 Zhang H., Goddard W.A., **Lu Q.*** and Cheng M.*, “[The Importance of Grand-Canonical Quantum Mechanical Methods to Describe the Effect of Electrode Potential on the Stability of Intermediates Involved in both Electrochemical CO₂ Reduction and Hydrogen Evolution](#)”, *Physical Chemistry Chemical Physics*, 20(4), 2549-2557 (2018)
- 7 Chang K., Chen J.G., **Lu Qi.*** and Cheng M.*, “[Grand Canonical Quantum Mechanical Study of the Effect of the Electrode Potential on N-Heterocyclic Carbene Adsorption on Au Surfaces](#)”, *Journal of Physical Chemistry C*, 121(44), 24618-24625 (2017)
- 8 Chang K., Chen J.G., **Lu Qi.*** and Cheng M.*, “[Quantum Mechanical Study of N-Heterocyclic Carbene Adsorption on Au Surfaces](#)”, *Journal of Physical Chemistry A*, 121(13), 2674-2682 (2017)
- 9 Hutchings S. G., Luc W., **Lu Q.**, Zhou Y., Vlachos D. G., and Jiao F.*, “[Nanoporous Cu-Al-Co alloys for selective furfural hydrodeoxygenation to 2-methylfuran](#)”, *Industrial & Engineering Chemistry Research*, 56(14), 3866-3872 (2017)
- 10 Dunwell D.[#], **Lu Q.[#]**, Heyes J. M., Rosen J., Chen J. G., Yan Y.*, Jiao F.* and Xu B.*, “[The Central Role of Bicarbonate in the Electrochemical Reduction of CO₂ on Gold](#)”, *Journal of the American Chemical Society*, 139(10), 3774-3783 (2017) ([#]contributed equally to this work)
- 11 **Lu Q.** and Jiao F.*, “[Electrochemical CO₂ Reduction: Electrocatalyst, Reaction mechanism, and Process Engineering](#)”, *Nano Energy*, 29, 439-456 (2016)
- 12 **Lu Q.**, Chen C.-J., Luc W. W., Chen J. G., Bhan A.* and Jiao F.*, “[Ordered Mesoporous Metal Carbides with Enhanced Anisole Hydrodeoxygenation Selectivity](#)”, *ACS Catalysis*, 6(6), 3506-3514 (2016)
- 13 Rosen J., Hutchings G. S., **Lu Q.**, Forest R. V., Moore A. and Jiao F.*, “[Electrodeposited Zn Dendrites with Enhanced CO Selectivity for Electrocatalytic CO₂ Reduction](#)”, *ACS Catalysis*, 5, 4586 (2015)
- 14 Rosen J., Hutchings G. S., **Lu Q.**, Rivera S., Zhou Y., Vlachos D. G. and Jiao F.*, “[Mechanistic Insights into the Electrochemical Reduction of CO₂ to CO on Nanostructured Ag Surfaces](#)”, *ACS Catalysis*, 5, 4293 (2015)
- 15 **Lu Q.**, Hutchings G. S., Yu W., Zhou Y., Forest R.V., Tao R., Rosen J., Yonemoto B. T., Cao Z., Zheng H., Xiao J. Q., Jiao F.* and Chen J. G.*, “[Highly Porous Non-precious Bimetallic Electrocatalysts for Efficient Hydrogen Evolution](#)”, *Nature Communications*, 6, 6567 (2015)
- 16 Zhou Y.[#], **Lu Q.[#]**, Zhuang Z., Hutchings G. S., Kattel S., Yan Y., Chen J. G.*, Xiao J. Q.* and Jiao F.*, “[Oxygen Reduction at Very Low Overpotential on Nanoporous Ag Catalysts](#)”, *Advanced Energy Materials*, 5, 1500149 (2015) ([#]contributed equally to this work)

- 17 Yang L., Kimmel Y.C., **Lu Q.** and Chen J. G.*, “[Effect of Pretreatment Atmosphere on the Particle Size and Oxygen Reduction Activity of Low-loading Platinum Impregnated Titanium Carbide Powder Electrocatalysts](#)”, *Journal of Power Sources*, 287, 196 (2015)
- 18 **Lu Q.**, Rosen J. and Jiao F.*, “[Nanostructured Metallic Electrocatalysts for CO₂ Reduction](#)”, *Chemcatchem*, 7(1), 38-47 (2015) (*Cover article*)
- 19 **Lu Q.**[#], Rosen J.[#], Zhou Y., Hutchings G. S., Kimmel Y. C., Chen J. G. and Jiao F.*, “[A Highly Selective and Efficient Electrocatalyst for Carbon Dioxide Reduction](#)”, *Nature Communications*, 5, 3242 (2014) ([#]contributed equally to this work) (*Featured in Science, 349, 1158 (2015); Highlighted by Science Daily, EurekAlert!, R&D, etc.*)
- 20 **Lu Q.**, Hutchings G. S., Zhou Y., Xin, H. L., Zheng H. and Jiao F.*, “[Nanostructured Flexible Mg-modified LiMnPO₄ Matrix as High-rate Cathode Materials for Li-ion Batteries](#)”, *Journal of Material Chemistry A*, 2(18), 6368-6373 (2014) (*Most Accessed Article for 2014 in JMCA*)
- 21 Jiao F.*, Hoang Y., Hutchings G. S. Yonemoto B. T., **Lu Q.** and Kleitz F.*, “[Synthesis, Structural Characterization, and Electrochemical Performance of Nanocasted Mesoporous Cu-/Fe-based Oxides](#)”, *Journal of Material Chemistry A*, 2(9), 3065-3071 (2014)
- 22 **Lu Q.**, Chen J. G. and Xiao J. Q.*, “[Nanostructured Electrodes for High-performance Pseudocapacitors](#)”, *Angewandte Chemie-International Edition*, 52(7): 1882-1889 (2013)
- 23 Hutchings G. S., **Lu Q.** and Jiao F.*, “[Synthesis and Electrochemistry of Nanocrystalline M-TiO₂ \(M = Mn, Fe, Co, Ni, Cu\) Anatase](#)”, *Journal of The Electrochemical Society*, 160(3): A511-A515 (2013)
- 24 **Lu Q.**, Chen Y., Li W., Chen J. G., Xiao J. Q. and Jiao F.*, “[Ordered Mesoporous Nickel Cobaltite Spinel with Ultra-high Supercapacitance](#)”, *Journal of Material Chemistry A*, 1(6): 2331-2336 (2013)
- 25 Shen. J., Liu S., Kou X., Fan X., **Lu Q.**, Zhang H. and Xiao J. Q.*, “[Robust and Tunable One-way Magnetic Surface Plasmon Waveguide: An Experimental Demonstration](#)”, *Plasmonics*, 7(2): 287-291 (2012)
- 26 **Lu Q.**, Lattanzi M. W., Chen Y., Kou X., Li W., Fan X., Unruh K. M., Chen J. G. and Xiao J. Q.*, “[Supercapacitor Electrodes with High-energy and power densities prepared from monolithic NiO/Ni Nanocomposite](#)”, *Angewandte Chemie-International Edition*, 50(30): 6847-6850 (2011) (*Cover article; Highlighted in MaterialViews, ChemistryViews, PhysOrg, etc.*)
- 27 Kou X., Fan X., Dumas R. K. **Lu Q.**, Zhang Y. Zhu H. Zhang X. Liu K. and Xiao J. Q.*, “[Memory Effect in Magnetic Nanowire Arrays](#)”, *Advanced Materials*, 23(11): 1393-1397 (2011)
- 28 Chen Y., Fan X., **Lu Q.**, and Xiao J. Q.*, “[Damping Dependence in Microwave Assisted Magnetization Reversal](#)”, *Journal of Applied Physics*, 110(5): 053905 (2011)
- 29 Chen X., Unruh K. M., Ni C., Ali B., Sun Z., **Lu Q.**, Deitzel J. and Xiao J. Q.*, “[Fabrication, Formation Mechanism, and Magnetic Properties of Metal Oxide Nanotubes via Electrospinning and Thermal Treatment](#)”, *Journal of Physical Chemistry C*, 115(2): 373-378 (2011)
- 30 **Lu Q.**, Mellinger Z. J., Wang W., Li W., Chen Y. Chen J. G. and Xiao J. Q.*, “[Differentiation of Bulk and Surface Contribution to Supercapacitance in Amorphous and Crystalline NiO](#)”, *Chemsuschem*, 3(12): 1267-1370 (2010)

HONORS AND AWARDS

Thousand Youth Talent Plan, 2016

Fondazione Oronzio e Niccolò De Nora Fellowship in Applied Electrochemistry, 2014

Daicar-Bata Prizes for Best Research Paper, University of Delaware, 2011

First Prize Annual Research Competition, Center for Composite Materials, University of Delaware, 2011

Professional Development Award, University of Delaware, 2008

RESEARCH PRESENTATIONS (SELECTED)

1. **Lu Q.**, Jiao F. and Chen J. G., “Non-Precious Multimetallic Catalyst with Bimodal Porous Structure for High-Performance Hydrogen Evolution Activity”, the American Institute of Chemical Engineers, 11/08/2014, Atlanta, Georgia, U.S.
2. **Lu Q.** and Jiao F., “Ordered Mesoporous Nickel Cobaltite Spinel with Ultra-high Supercapacitance”, the American Chemical Society Spring Meeting, 04/10/2013, New Orleans, Louisiana, U.S.
3. **Lu Q.** and Xiao J. Q., “Supercapacitor Electrodes with High-energy and power densities prepared from monolithic NiO/Ni Nanocomposite”, the American Physical Society March Meeting, 02/27/2012, Boston, Massachusetts, U.S.

PATENTS

- 1 Jiao F., **Lu Q.**, Hutchings, G. S., and Chen J. G., “Bimetallic Electrocatalyst for Hydrogen Evolution and Oxidation Reactions”, US Patent US9994961B2 (2018).
- 2 **Lu Q.**, Unruh K. M. and Xiao J. Q., “Supercapacitor Electrode and Associated Methods of Manufacturing”, International Patent Publication: WO2013163259 A2