

L. Robert Baker, The Ohio State University

Education and Training

Brigham Young University	Chemistry	B.S. 2007
Brigham Young University	Chemistry	M.S. 2008
University of California, Berkeley	Chemistry	Ph.D. 2012

Research and Professional Experience

2019–present	Associate Professor, Chemistry and Biochemistry, The Ohio State University
2014–2019	Assistant Professor, Chemistry and Biochemistry, The Ohio State University
2012–2014	University of California, Berkeley, Postdoctoral Advisor: Stephen R. Leone
2008–2012	University of California, Berkeley, Ph.D. Advisor: Gabor A. Somorjai

Selected Publications

(† Corresponding author)

11. S. Biswas, S. Wallentine, S. Bandaranayake, and **L. R. Baker**[†], “Controlling Polaron Formation at Hematite Surfaces by Molecular Functionalization Probed by XUV Reflection-Absorption Spectroscopy,” *Journal of Chemical Physics*, **2019**, Just Accepted. (**Editor-selected Feature Article**)
10. E. Fugate, S. Biswas, M. Clement, M. Kim, D. Kim, A. Asthagiri[†], and **L. R. Baker**[†], “The Role of Phase Impurities and Lattice Defects on the Electron Dynamics and Photochemistry of CuFeO₂ Solar Photocathodes,” *Nano Research*, **2019**, Just Accepted. (**NR45 Special Issue highlighting L. R. Baker as Young Innovator in NanoEnergy**)
9. S. Biswas, J. Husek, S. Londo, E. A. Fugate, and **L. R. Baker**[†], “Identifying the Acceptor State in NiO Hole Collection Layers: Direct Observation of Exciton Dissociation and Interfacial Hole Transfer Across a Fe₂O₃/NiO Heterojunction,” *Physical Chemistry Chemical Physics*, **20**, 24545–24552 (2018). (**Cover Article**)
8. S. Biswas, J. Husek, S. Londo, and **L. R. Baker**[†], “Ultrafast Electron Trapping and Defect-Mediated Recombination in NiO Probed by Femtosecond Extreme Ultraviolet (XUV) Reflection-Absorption Spectroscopy,” *Journal of Physical Chemistry Letters*, **9**, 5047–5054 (2018).
7. J. Husek, A. Cirri, S. Biswas, A. Asthagiri, **L. R. Baker**[†], “Hole Thermalization Dynamics Facilitate Ultrafast Spatial Charge Separation in CuFeO₂ Solar Photocathodes,” *Journal of Physical Chemistry C*, **122**, 11300–11304 (2018).
6. S. Biswas, J. Husek, **L. R. Baker**[†], “Elucidating Ultrafast Electron Dynamics at Surfaces Using Extreme Ultraviolet (XUV) Reflection-Absorption Spectroscopy,” *Chemical Communications*, **54**, 4216–4230 (2018). (**Invited Feature Article**)
5. S. Biswas, J. Husek, S. Londo, and **L. R. Baker**[†], “Highly Localized Charge Transfer Excitons in Metal Oxide Semiconductors,” *Nano Letters*, **18**, 1228–1233 (2018). (**Highlighted by Advances in Engineering**)
4. J. Husek, A. Cirri, S. Biswas, and **L. R. Baker**[†], “Surface Electron Dynamics in Hematite (α -Fe₂O₃): Correlation Between Ultrafast Surface Electron Trapping and Small Polaron Formation,” *Chemical Science*, **8**, 8170–8178 (2017).
3. A. Cirri, J. Husek, S. Biswas, and **L. R. Baker**[†], “Achieving Surface Sensitivity in Ultrafast XUV Spectroscopy: M_{2,3}-Edge Reflection–Absorption of Transition Metal Oxides,” *Journal of Physical Chemistry C*, **121**, 15861–15869 (2017).
2. Y. Mueannern, X. Yang, Y. Tang, F. Tao, and **L. R. Baker**[†], “Catalysis at Multiple Length Scales: Crotonaldehyde Hydrogenation at Nanoscale and Mesoscale Interfaces in Platinum–Cerium Oxide Catalysts,” *Journal of Physical Chemistry C*, **121**, 13765–13776 (2017).
1. X. Yang, E. A. Fugate, **L. R. Baker**[†], “Photo-Electrochemical CO₂ Reduction to Acetate on Iron–Copper Oxide Catalysts,” *ACS Catalysis*, **7**, 177–180 (2017).

Funding and Awards

Principal Investigator for total federal funding of \$2.7M

1. ***AFOSR Young Investigator Award***, FA9550-15-1-0204, \$360,000, 2015
2. ***DOE Early Career Award***, DE-SC0014051, \$760,000, 2015
3. ***NSF Major Research Instrumentation***, 1625792, \$669,000, 2016
4. ***NSF Chemical Catalysis***, 1665280, \$449,541, 2017
5. ***AFOSR Molecular Dynamics and Theoretical Chemistry***, FA9550-19-1-0184, \$450,000, 2019
6. ***Young Innovator in NanoEnergy***, List of 45 under 45, Springer, 2019
7. ***Kavli Emerging Leader in Chemistry ACS Physical Division Nominee***, 2018
8. ***Finalist for Victor K. LaMer Award***, ACS Colloid & Surface Science Division, 2016

Oral Presentations

56 talks presented or scheduled, including 43 invited talks. Invited talks include:

1. 14th Femtochemistry Conference, Shanghai, China
2. International School on Frontiers of Attosecond and Ultrafast X-Ray Science, Erice, Italy, March 2019
3. Max Planck Institute of Quantum Optics, Garching, Germany, December 2018
4. Fritz Haber Institute, Berlin, Germany, December 2018
5. Molecular Interactions and Dynamics Gordon Research Conference, Easton, MA, July 2018
6. Photochemistry Gordon Research Conference, Lewiston, ME, July 2017
7. LaMer Keynote Address, ACS Colloid and Surface Science Symposium, Boston, MA, June 2016
8. 9 Invited talks at ACS/ECS national meetings
9. 20 Invited department seminars/colloquia

Organized Symposia

1. “High Harmonic Generation and XUV Spectroscopy,” International Symposium on Molecular Spectroscopy, Champaign, IL, June 2019 (Scott Sayres and Josh Vura-Weis, co-organizers)
2. “Elucidation of Mechanisms and Kinetics on Surfaces,” ACS National Meeting, Orlando, FL, April 2019 (Alexy Ignatchenko, Siris Laursen, and Aditya Savara, co-organizers)
3. “Applications of Ambient Pressure XPS to Catalysis Studies,” ACS National Meeting, Boston, MA, August 2018 (Huimin Liu and Franklin Tao, co-organizers)
4. “Elucidation of Mechanisms and Kinetics on Surfaces,” ACS National Meeting, New Orleans, LA, April 2018 (Siris Laursen and Aditya Savara, co-organizers)
5. “Frontiers at Interfaces: Probing the Mechanisms of Interfacial Carrier Dynamics and Surface Reactions,” APS National Meeting, New Orleans, LA, March 2017 (Xiaoyang Zhu, co-organizer)

Panel Writer, DOE Basic Research Needs Workshop

Next Generation Electrical Energy Storage, Panel 2: Structure, Interphases, and Charge Transfer at Electrochemical Interfaces, Washington DC, March 2017

Peer Reviewer

1. Journal Peer Review: 71 manuscripts from 24 journals since 2014
2. Department of Energy, Condensed Phase and Interfacial Molecular Sciences Program
3. Air Force Office of Scientific Research, Molecular Dynamics and Theoretical Chemistry Program
4. National Science Foundation, Major Research Instrumentation – Spectroscopy
5. National Science Foundation, Centers for Chemical Innovation
6. National Science Foundation, CAREER Program
7. Netherlands Organisation for Scientific Research, Innovational Research Incentives Scheme Veni
8. Stanford Synchrotron Radiation Light Source, Beam line user proposals