Bingjun Xu

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EDUCATION

Harvard University *Cambridge, MA, USA*
- Ph.D. Physical Chemistry (Adviser: Prof. Cynthia M. Friend) *2007 – 2011*
  Thesis: Fundamental Concepts in Catalytic Oxidative-Coupling Reactions on Metallic Gold

Fudan University *Shanghai, P.R. China*
- M.S. Physical Chemistry (Adviser: Prof. Zi Gao) *2004 - 2007*
- B.S. Chemistry *2000 - 2004*

PROFESSIONAL EXPERIENCE

Assistant Professor, Department of Chemical & Biomolecular Engineering, University of Delaware *2013 – Present*
Thrust Leader, Catalysis Center for Energy Innovation, University of Delaware *2011 – 2013*
Postdoctoral Fellow, California Institute of Technology (Adviser: Prof. Mark E. Davis) *2011 – 2013*

HONORS & AWARDS

I&EC 2018 Class of Influential Researchers *2018*
National Science Foundation CAREER Award *2017*
Air Force Office of Scientific Research Young Investigator Award *2016*
ACS Petroleum Research Fund Doctoral New Investigator Award *2015*
University of Delaware Research Foundation Award *2015*
National Graduate Research Award of American Vacuum Society *2011*
Fieser Lectureship of Department of Chemistry and Chemical Biology, Harvard University *2011*
Chinese Government Award for Outstanding Students Abroad *2011*
Harvard Graduate Consortium on Energy and Environment Fellowship *2008*
Distinguished Master's Thesis Award *2008*
Honeywell Scholarship *2006*
Distinguished Graduate of Shanghai *2004*
Unilever Scholarship *2003*

PROFESSIONAL MEMBERSHIPS

American Institute of Chemical Engineers *2012 - Present*
American Chemical Society *2008 - Present*
North American Catalysis Society *2011 - Present*
Catalysis Club of Philadelphia *2013 - Present*
Northeast Corridor Zeolite Association *2016 - Present*

PROFESSIONAL SERVICE

Editorial Board Member, Nature Scientific Reports *2016 – Present*
Program Chair, Northeast Corridor Zeolite Association *2016 – Present*
Early Career Editorial Advisory Board, ACS Catalysis *2017 – 2018*
Director, Catalysis Club of Philadelphia *2014 – 2016*

PUBLICATIONS (*: Corresponding author, *Italicized: Undergraduate coauthor*)

1. X. Yang, S. Kattel, J. Nash, X. Chang, J. Lee, Y. Yan*, J. Chen* and B. Xu*, "Quantification of Active Sites and Elucidation of Reaction Mechanism of Electrochemical Nitrogen Reduction Reaction on Vanadium Nitride", *Angew. Chem. In. Ed.*, **2019**, in press
2. Y. Zhao, B. Setzler, J. Wang, J. Nash, B. Xu and Y. Yan*, "An Efficient Direct Ammonia Fuel Cell for Affordable Carbon-Neutral Transportation", *Joule*, **2019**, Accepted.
3. H. Zhang, X. Chang, J. Chen, W. Goddard III, B. Xu*, M Cheng* and Q. Lu*, "Computational and experimental demonstrations of one-pot tandem catalysis for electrochemical carbon dioxide reduction to methane", *Nat. Commun.*, **2019**, Accepted.
4. J. Wu, B. Murphy, N. Gould, C. Wang, L. Ma, B. Xu*, "A FTIR Study of the Acidity of In-Situ Generated Brønsted Sites on NaY via Displacement Reactions", *ChemCatChem*, **2019**, Accepted.
5. J. Wang, Y. Zhao, B. Setzler, S. Rojas-Carbonell, C. Yehuda, A. Amel, M. Page, L. Wang, K. Hu, L. Shi, S. Gottesfeld, B. Xu*, Y. Yan*, "Poly(aryl piperidinium) Membranes and Ionomers for Hydroxide Exchange Membrane Fuel Cells", *Nat. Energy*, 4, **2019**, 392.
6. J. Jiao, R. Lin, S. Liu, W. Cheong, C. Zhang, Z. Chen, Y. Pan, K. Wu, S. Hung, H. Chen, L. Zheng, Q. Lu, X. Yang, B. Xu, H. Xiao*, J. Li, D. Wang, Q. Peng, C. Chen*, Y. Li, "Cu Atom-Pair Catalyst Anchored on Ally Nanowires for Selective and Efficient Electrochemical Reduction of CO_2", *Nat. Chem.*, **2019**, Accepted.
7. B. Murphy, J. Wu, H. Cho, *J. Soreo*, C. Wang, L. Ma, B. Xu*, "Nature and Catalytic Properties of In Situ Generated Brønsted Acid Sites on NaY", *ACS Catal.*, 9, **2019**, 1931. **(Cover Story)**
8. H. Cho, N. Gould, V. Vattipalli, S. Sabnis, W. Chaikittisilp, T. Okubo, B. Xu, W. Fan*, "Fabrication of Hierarchical Lewis Acid Sn-BEA with Tunable Hydrophobicity for Cellulosic Sugar Isomerization", *Microporous Mesoporous Mater.*, 278, **2019**, 387.
9. A. Malkani, M. Dunwell, B. Xu*, "Operando Spectroscopic Investigations of Copper and Oxide Derived Copper Catalysts for Electrochemical CO Reduction", *ACS Catal.*, 9, **2019**, 474.
10. F. Jiao*, B. Xu*, "Electrochemical Ammonia Synthesis and Ammonia Fuel Cells", *Adv. Mater.*, **2018**, 1805173. **(Invited Perspective)**
11. J. Nash, J. Zheng, Y. Wang, B. Xu*, Y. Yan*, "Mechanistic Study of the Hydrogen Oxidation/Evolution reaction over Bimetallic PtRu Catalysts in Alkaline Electrolytes", *J. Electrochem. Soc.*, 165, **2018**, J3378.
12. H. Cho, D. Kim, J. Li, D. Su, B. Xu*, "Zeolite Encapsulated Pt Nanoparticles for Tandem Catalysis", *J. Am. Chem. Soc.*, 140, **2018**, 13514.
13. X. Yang, J. Nash, J. Anibal, M. Dunwell, S. Kattel, E. Stavitski, K. Attenkofer, J. Chen*, Y. Yan*, B. Xu*, "Mechanistic Insights into Electrochemical Nitrogen Reduction Reaction on Vanadium Nitride Nanoparticles", *J. Am. Chem. Soc.*, 140, **2018**, 13387.
14. S. Giles, J. Wilson, J. Nash, J. Zheng, B. Xu, D. Vlachos*, Y. Yan*, "Recent Advances in Understanding the pH Dependence of the Hydrogen Oxidation and Evolution Reactions", *J. Catal.*, 367, **2018**, 328.
15. M. Dunwell, X. Yang, Y. Yan*, B. Xu*, "Potential Routes and Mitigation Strategies of Contamination in Interfacial Specific Infrared Spectroelectrochemical Studies", *J. Phys. Chem. C*, 122, **2018**, 24658. **(Cover Story)**
16. B. Murphy, T. Mou, B. Wang, B. Xu*, "Effect of Co-Fed Species on the Kinetics of Catalytic Methyl Lactate Dehydration on NaY", *ACS Catal.*, 8, **2018**, 9066.
17. N. Gould, B. Xu*, "Temperature Programmed Desorption of Pyridine on Zeolites in the Presence of Liquid Solvents", *ACS Catal.*, 8, **2018**, 8699.
18. M. Dunwell, W. Luc, Y. Yan*, F. Jiao*, B. Xu*, "Understanding Surface-Mediated Electrochemical Reactions: 2-Electron CO2 Reduction and Beyond", *ACS Catal.*, 8, **2018**, 8121. **(Invited Perspective)**
19. M. Dunwell, Y. Yan*, B. Xu*, "Understanding the Influence of the Electrical Double-Layer on Heterogeneous Electrochemical Reactions", *Curr. Opin. Chem. Eng.*, 20, **2018**, 151. **(Invited Review)**
20. M. Gilkey, *R. Balakumar*, D. Vlachos*, B. Xu*, "Adipic Acid Production Catalyzed by a Combination of a Solid Acid and an Iodide Salt from Biomass-Derived Tetrahydrofuran-2,5-dicarboxylic Acid", *Catal. Sci. Tech.*, 57, **2018**, 5591.

21. M. Dunwell, X. Yang, B. Setzler, J. Anibal, Y. Yan*, B. Xu*, "Examination of Near-Electrode Concentration Gradients and Kinetic Impacts on the Electrochemical Reduction of CO2 using Surface Enhanced Infrared Spectroscopy", *ACS Catal.*, 8, **2018**, 3999.
22. M. Gilkey, C. Brady, D. Vlachos, B. Xu*, "Characterization of Oxidation States in Metal/Metal Oxide Catalysts in Liquid-Phase Hydrodeoxygenation Reactions with a Trickle Bed Reactor", *Ind. Eng. Chem. Res.*, 57, **2018**, 5591. **(Cover story)**
23. B. Murphy, B. Xu*, "Foundational Techniques for Catalyst Design in the Upgrading of Biomass-Derived Multifunctional Molecules", *Prog. Energy Combust. Sci.*, 67, **2018**, 1. **(Invited Review)**
24. J. Zheng, J. Nash, B. Xu, Y. Yan*, "Towards establishing apparent hydrogen binding energy as the descriptor for hydrogen oxidation/evolution reactions", *J. Electrochem. Soc.*, 105, **2018**, H27.
25. N. Gould, B. Xu*, "Catalyst Characterization in the Presence of Solvent: Development of Liquid Phase Structure-Activity Relationships", *Chem. Sci.*, 9, **2018**, 281. **(Invited Review)**
26. N. Gould, B. Xu*, "Quantification of Acid Site Densities on Zeolites in the Presence of Solvents via Determination of Extinction Coefficients of Adsorbed Pyridine", *J. Catal.*, 358, **2018**, 80.
27. A. Mehdad, N. Gould, B. Xu, R. Lobo*, "Effect of Steam and CO_2 on Ethane Activation over Zn-ZSM-5", *Catal. Sci. Tech.*, 8, **2018**, 358.
28. M. Gilkey, A. Mironenko, D. Vlachos*, B. Xu*, "Adipic Acid Production via Metal-Free Selective Hydrogenolysis of Biomass-Derived Tetrahydrofuran-2,5-dicarboxylic acid", *ACS Catal.*, 7, **2017**, 6619. **(Cover story)**
29. J. Nash, X. Yang, J. Anibal, J. Wang, Y. Yan*, B. Xu*, "Electrochemical Nitrogen Reduction Reaction on Noble Metal Catalysts in Proton and Hydroxide Exchange Membrane Electrolyzers", *J. Electrochem. Soc.*, 164, **2017**, F1712.
30. M. Dunwell, Y. Yan*, B. Xu*, "In-Situ Infrared Spectroscopic Investigations of Pyridine-Mediated CO_2 Reduction on Pt Electrocatalysts", *ACS Catal.*, 7, **2017**, 5410.
31. M. Gilkey, D. Vlachos*, B. Xu*, "Poisoning of Ru/C by Homogeneous Brønsted Acids in Hydrodeoxygenation of 2,5-Dimethylfuran via Catalytic Transfer Hydrogenation", *Appl. Catal. A*, 542, **2017**, 327.
32. S. Liu, S. Dutta, W. Zheng, N. Gould, Z. Cheng, B. Xu, D. Vlachos*, B. Saha*, "Catalytic Hydrodeoxygenation of High Carbon Furylmethanes to Renewable Jet-fuel Ranged Alkanes over a Rhenium Modified Iridium Catalyst", *ChemSusChem*, 10, **2017**, 3225. **(Cover story)**
33. C. Brady, B. Murphy, B. Xu*, "Enhanced Methane Dehydroaromatization via Coupling with Chemical Looping", *ACS Catal.*, 7, **2017**, 3924.
34. C. Friend*, B. Xu*, "Heterogeneous Catalysis – A Central Science for a Sustainable Future", *Acc. Chem. Res.*, 50, **2017**, 517. **(Invited Perspective)**
35. M. Dunwell, Q. Lu, J. Heyes, J. Rosen, J. Chen, Y. Yan*, F. Jiao*, B. Xu*, "The Central Role of Bicarbonate in the Electrochemical Reduction of CO_2 on Gold", *J. Am. Chem. Soc.*, 139, **2017**, 3774.
36. B. Murphy, *M. Letterio*, B. Xu*, "Catalyst Deactivation in Pyridine-Assisted Selective Dehydration of Methyl Lactate on NaY", *ACS Catal.*, 7, **2017**, 1912.
37. H. Cho, L. Ren, V. Vattipailli, Y. Yeh, N. Gould, B. Xu, R. Gorte, R. Lobo, P. Dauenhauer, M. Tsapatsis, W. Fan*, "Renewable p-Xylene from 2,5-Dimethylfuran and Ethylene Using Phosphorus-containing Zeolite Catalysts", *ChemCatChem*, 9, **2017**, 398.
38. M. Dunwell, J. Wang, Y. Yan*, B. Xu*, "Surface Enhanced Spectroscopic Investigations of Impact of Cations on Electrochemical Interfaces", *PhysChemChemPhys*, 19, **2017**, 971.
39. M. Gilkey, A. Mironenko, *L. Yang, D.* Vlachos*, B. Xu*, "Insights into Ring Opening of Biomass-Derived Furanics over Ru/C", *ChemSusChem*, 9, **2016**, 3113.
40. N. Gould, B. Xu*, "Effect of Liquid Water on Acid Sites of NaY: An in-situ Liquid Phase Spectroscopic Study", *J. Catal.*, 342, **2016**, 193.
41. J. Heyes, M. Dunwell, B. Xu*, "CO_2 Reduction on Cu at Low Overpotentials with Surface Enhanced In-Situ Spectroscopy", *J. Phys. Chem. C*, 120, **2016**, 17334.
42. B. Murphy, *M. Letterio*, B. Xu*, "Selectivity Control in the Catalytic Dehydration of Methyl Lactate: The Effect of Pyridine", *ACS Catal.*, 6, **2016**, 5117.

43. B. Murphy, *M. Letterio*, B. Xu*, "Catalytic Dehydration of Methyl Lactate: Reaction Mechanism and Selectivity Control", *J. Catal.*, 339, **2016**, 21.
44. K. Schwarz*, B. Xu, Y. Yan, R. Sundararaman, "Partial Oxidation of Step-Bound Water Leads to Anomalous pH Effects on Metal Electrode Step-Edges", *PhysChemChemPhys*, 18, **2016**, 16216.
45. J. Zheng, B. Xu*, Y. Yan*, "Universal Dependence of Hydrogen Oxidation and Evolution Reaction Activity of Platinum-Group-Metals on pH and Hydrogen Binding Energy", *Sci. Adv.*, 2, **2016**, e1501602. (Covered by Phys.org)
46. J. Zheng, B. Xu*, Y. Yan*, "Size-dependent Hydrogen Oxidation and Evolution Activities on Supported Palladium Nanoparticles in Acid and Base", *J. Electrochem. Soc.*, 163, **2016**, F499.
47. M. Gilkey, B. Xu*, "Heterogeneous Catalytic Transfer Hydrogenation as an Effective Pathway in Biomass Upgrading", *ACS Catal.*, 6, **2016**, 1420. **(Invited Review)**
48. M. Dunwell, Y. Yan*, B. Xu*, "A Surface-Enhanced Infrared Absorption Spectroscopic Study of pH Dependent Water Adsorption on Au", *Surf. Sci.*, 650, **2015**, 51.
49. J. Wang, S. Gu, R. Xiong, B. Zhang, B. Xu*, Y. Yan*, "Structure-Property Relationships in Hydroxide-Exchange Membranes with Cation Strings and High Ion-Exchange Capacity", *ChemSusChem*, 8, **2015**, 4229.
50. J. Zheng, Y. Yan*, B. Xu*, "Correcting Hydrogen Diffusion Limitation in Rotating Disk Electrode Measurements of Hydrogen Reaction Kinetics", *J. Electrochem. Soc.*, 162, **2015**, F1470.
51. M. Gilkey, P. Panagiotopoulou, A. Mironenko, G. Jennes, D. Vlachos*, B. Xu*, "Mechanistic Insights into Metal-Lewis Acid Mediated Catalytic Transfer Hydrogenation of Furfural to 2-Methylfuran", *ACS Catal.* 5, **2015**, 3988.
52. J. Zheng, Z. Zhuang, B. Xu*, Y. Yan*, "Correlating Hydrogen Oxidation/Evolution Reaction Activity With the Minority Weak Hydrogen-Binding Sites on Ir/C Catalysts", *ACS Catal.* 5, **2015**, 4449.
53. A. Mironenko, M. Gilkey, P. Panagiotopoulou, *G. Facas*, D. Vlachos*, B. Xu*, "Ring Activation of Furnace Compounds on Ru-Based Catalysts", *J. Phys. Chem. C*, 119, **2015**, 6075.
54. B. Murphy, M. Davis, B. Xu*, "The Effect of Adsorbed Molecule Gas-Phase Deprotonation Enthalpy on Ion Exchanged in Sodium Exchanged Zeolites: an *in-situ* FTIR Investigation", *Top. Catal.*, 58, **2015**, 393.
55. S. Gu, B. Xu, Y. Yan*, "Electrochemical Energy Engineering: A New Frontier of Chemical Engineering Innovation", *Annu. Rev. Chem. Biomol. Eng.*, 5, **2014**, 429. **(Invited Review)**

Prior to joining University of Delaware

56. B. Xu, C. Siler, R. Madix, C. Friend, "Predicting Gold-Mediated Catalytic Oxidative-Coupling Reactions from Single Crystal Studies", *Acc. Chem. Res.*, 47, **2014**, 761.
57. B. Xu, C. Siler, R. Madix, C. Friend, "Ag/Au Mixed Sites Promote Oxidative Coupling of Methanol on the Alloy Surface", *Chem. Euro. J.* 20, **2014**, 4646. (Covered by ChemistryViews: Understanding Noble Metal Catalysis)
58. B. Xu, R. Madix, C. Friend, "Alkyl Groups as Synthetic Vehicles in Gold-Mediated Oxidative Coupling Reactions", *Phys. Chem. Chem. Phys.*, 15, **2013**, 3179.
59. B. Xu, Y. Bhawe, M. Davis, "Spinel Metal Oxide-Alkali Carbonate-Based, Low-Temperature Thermochemical Cycles for Water Splitting and CO_2 Reduction", *Chem. Mater.* 25, **2013**, 1564.
60. B. Xu, Y. Bhawe, M. Davis, "Low-Temperature, Manganese Oxide-Based Thermochemical Water Splitting Cycle", *Proc. Natl. Acad. Sci.* 109, **2012**, 9260.
61. C. Siler, B. Xu, C. Friend, R. Madix, "Role of Surface-Bound Intermediates in the Oxygen-Assisted Synthesis of Amides by Metallic Silver and Gold", *J. Am. Chem. Soc.* 134, **2012**, 12604.
62. B. Xu, R. Madix, C. Friend, "Dual-Function of Alcohols in Gold-Mediated Selective Coupling of Amines and Alcohols", *Chem. Euro. J.* 18, **2012**, 2313.
63. B. Xu, R. Madix, C. Friend, "Activated Metallic Gold as an Agent for Direct Methoxycarbonylation", *J. Am. Chem. Soc.* 133, **2011**, 20378.
64. B. Xu, C. Friend, "Oxidative Coupling of Alcohols on Gold: Insights from Experiments and Theory", *Faraday Discuss.* 152, **2011**, 307.
65. B. Xu, C. Friend, R. Madix, "A Paradigm for Predicting Selective Oxidation on Noble Metals: Oxidative Catalytic Coupling of Amines and Aldehydes on Metallic Gold", *Faraday Discuss.* 152, **2011**, 241.

66. B. Xu, J. Haubrich, T. Baker, E. Kaxiras, C. Friend, "Theoretical Study of O-Assisted Selective Coupling of Methanol on Au(111)", *J. Phys. Chem. C* 155(9), **2011**, 3703.
67. B. Xu, R. Madix, C. Friend, "Achieving optimum selectivity in oxygen assisted alcohol cross-coupling on gold", *J. Am. Chem. Soc.* 132, **2010**, 16571.
68. B. Xu, J. Habrich, C. Freyschlag, R. Madix, C. Friend, "Oxygen-Assisted Cross-Coupling of Methanol with Alkyl Alcohols on Metallic Gold", *Chem. Sci.* 1, **2010**, 310. (Cover story)
69. B. Xu, X. Liu, J. Haubrich, C. Friend, "Vapor-Phase Gold-Surface-Mediated Coupling of Aldehydes with Methanol", *Nat. Chem.* 2, **2010**, 61.
70. B. Xu, L. Zhou, R. Madix, C. Friend, "Highly Selective Acylation of Dimethylamine Mediated by Oxygen Atoms on Metallic Gold Surfaces", *Angew. Chem., Int. Ed.* 49, **2010**, 394.
71. L. Zhou, C. Freyschlag, B. Xu, R. Madix, C. Friend, "Direct Selective Oxygen-Assisted Acylation of Amines Driven By Metallic Silver Surfaces: Dimethylamine with Formaldehyde", *Chem. Commun.* 46, **2010**, 704.
72. X. Liu, B. Xu, J. Haubrich, R. Madix, C. Friend, "Surface-Mediated Self-Coupling of Ethanol on Gold", *J. Am. Chem. Soc.* 131, **2009**, 5757.
73. B. Xu, X. Liu, J. Haubrich, R. Madix, C. Friend, "Selectivity Control in Gold-Mediated Esterification of Methanol", *Angew. Chem., Int. Ed.* 48, **2009**, 4206.
74. L. Zhou, B. Xu, W. Hua, Y. Yue, Z. Gao, "Sulfated Tin Oxide: An Efficient Catalyst for Alkylation of Hydroquinone with Tert-Butanol", *Catal. Commun.* 9, **2008**, 2274.
75. B. Xu, T. Li, B. Zheng, W. Hua, Y. Yue, Z. Gao, "Enhanced Stability of HZSM-5 Supported Ga_2O_3 Catalyst in Propane Dehydrogenation by Dealumination", *Catal. Lett.* 119, **2007**, 283.
76. B. Xu, H. Li, W. Hua, Y. Yue, Z. Gao, "MSU-$S_{(BEA)}$ Mesoporous Molecular Sieve: An Active and Stable Catalyst for Alkylation of Hydroquinone", *Microporous Mesoporous Mater.* 88, **2006**, 191.
77. B. Xu, B. Zheng, W. Hua, Y. Yue, Z. Gao, "Support Effect in Dehydrogenation of Propane in the Presence of CO_2 over Supported Gallium Oxide Catalysts", *J. Catal.* 239, **2006**, 470.
78. B. Xu, H. Li, W. Hua, Y. Yue, Z. Gao, "Role of Surface Pockets on MCM-49 Structure in the Alkylation of Hydroquinone with Tert-Butanol", *J. Catal.* 240, **2006**, 31.
79. B. Xu, W. Hua, Y. Yue, Z. Gao, "Alkylation of Hydroquinone with Tert-Butanol over AlSBA-15 Mesoporous Molecular Sieves", *Catal. Lett.* 100, **2005**, 95.

PATENTS

1. B. Xu, Y. Yan, X. Yang, M. Dunwell, "In-Situ Quantification of Catalysts Dissolution in Stirred Spectroelectrochemical Cell", US Patent Application No. 62/643,347 (2018).
2. B. Xu, D. Vlachos, M. Gilkey, A. Mironenko, R. Balakumar, "Metal-Free Catalytic Production of Adipic Acid From Biomass-Derived Tetrahydrofuran-2,5-Dicarboxylic Acid", US Patent Application No. 62/537,493 (2017).
3. Y. Yan, B. Xu, J. Wang, Y. Zhao, "Poly(aryl piperidinium) polymers for use as hydroxide exchange membranes and ionomers", US Patent Application No. 62/314,008 (2016).
4. M. Davis, B. Xu, Y. Bhawe, "Methods and materials for the catalytic reduction of carbon dioxide", US Patent 9,206,042 (2015).
5. M. Davis, B. Xu, Y. Bhawe, "Methods and materials for the thermochemical production of hydrogen from water", US Patent 8,940,269 (2015).
6. C. Friend, R. Madix, B. Xu, "Gold-catalyzed synthesis of alkyl carbonates from carbon monoxide", US Patent Application No. 8,937,197 (2015).
7. R. Madix, L. Zhou, B. Xu, C. Friend, C. Freyschlag, "Silver-catalyzed synthesis of amides from amines and aldehydes", US Patent Application No. 8,889,908 (2014).

INVITED LECTURES

Academic Intuitions

1. B. Xu, X. Yang, M. Dunwell, A. Malkani, "Achieving Molecular Level Understanding of Electrocatalytic Processes", Department of Chemistry, **City University of New York, Queens College**, NY, 2019.

2. B. Xu, H. Cho, X. Yang, J. Nash, A. Malkani, "Achieving Molecular Level Understanding of Thermo- and Electro- Catalytic Processes", College of Chemistry and Molecular Engineering, **Peking University**, Beijing, CHN, 2019.
3. B. Xu, X. Yang, M. Dunwell, A. Malkani, "Achieving Molecular Level Understanding of Electrocatalytic Processes", Department of Chemistry, **Boston College**, Boston, MA, 2018.
4. B. Xu, X. Yang, H. Cho, "Tailoring Efficient Renewable Catalytic Processes for a Sustainable Future", Department of Chemical & Biomolecular Engineering, **University of Massachusetts - Amherst**, Amherst, MA, 2018.
5. B. Xu, X. Yang, H. Cho, "Tailoring Efficient Renewable Catalytic Processes for a Sustainable Future", Department of Chemical & Biomolecular Engineering, **University of Pennsylvania**, Philadelphia, PA, 2018.
6. B. Xu, X. Yang, J. Nash, M. Dunwell, "Understanding and Tailoring Materials for Electrocatalytic Processes", Department of Materials Science & Engineering, **Cornell University**, Ithaca, NY, 2018.
7. B. Xu, N. Gould, "Developing the Tool Kit to Probe Liquid-Solid Interfaces in Biomass Upgrading", Mason Lecture Series, Department of Chemical Engineering, **Stanford University**, Palo Alto, CA, 2018.
8. B. Xu, M. Dunwell, B. Murphy, M. Gilkey, X. Yang, "Deciphering Surface Mediated Thermo- and Electro-Catalytic Processes by In-situ Spectroscopies", School of Engineering and Applied Sciences, **Harvard University**, Cambridge, MA, 2018.
9. B. Xu, M. Dunwell, B. Murphy, "Deciphering Surface Mediated Thermo- and Electro-Catalytic Processes by In-situ Spectroscopies", Department of Chemical and Biological Engineering, **University of Illinois**, Urbana-Champaign, IL, 2017.
10. B. Xu, M. Dunwell, B. Murphy, "Deciphering Surface Mediated Thermo- and Electro-Catalytic Processes by In-situ Spectroscopies", Department of Chemical Engineering, **University of Houston**, Houston, TX, 2017.
11. B. Xu, M. Dunwell, B. Murphy, "Deciphering Surface Mediated Thermo- and Electro-Catalytic Processes by In-situ Spectroscopies", Department of Chemical, Biological & Materials Engineering, **University of Oklahoma**, Norman, OK, 2017.
12. B. Xu, M. Dunwell, B. Murphy, C. Brady, "Deciphering Surface Mediated Thermo- and Electro-Catalytic Processes by In-situ Spectroscopies", Department of Mechanical Engineering, **Colorado School of Mines**, Golden, CO, 2017.
13. B. Xu, M. Dunwell, B. Murphy, "Deciphering Surface Mediated Thermo- and Electro-Catalytic Processes by In-situ Spectroscopies", Department of Chemical and Biological Engineering, **Drexel University**, Philadelphia, PA, 2017.
14. B. Xu, M. Dunwell, B. Murphy, "Deciphering Surface Mediated Thermo- and Electro-Catalytic Processes by In-situ Spectroscopies", Department of Chemical Engineering, **Iowa State University**, Ames, IA, 2017.
15. B. Xu, M. Dunwell, J. Heyes, "In-situ Surface Enhanced Spectroscopic Investigations of Electrochemical Interfaces", **Army Research Laboratory**, Adelphi, MD, 2016.
16. B. Xu, B. Murphy, M. Letterio, "Deciphering Complex Biomass Upgrade Processes on the Molecular Level", Institute for Catalysis, **Hokkaido University**, Sapporo, Hokkaido, Japan, 2015.
17. B. Xu, M. Dunwell, B. Murphy, M. Letterio, Y. Yan, "Deciphering Surface Mediated Thermo- and Electro-Catalytic Processes by In-situ Spectroscopies", Department of Chemistry, **Brigham Young University**, Provo, UT, 2015.
18. B. Xu, M. Gilkey, B. Murphy, D. Vlachos, "Deciphering Complex Biomass Upgrade Processes on the Molecular Level", Department of Chemical Engineering, **New Jersey Institute of Technology**, Newark, NJ, 2015.
19. B. Xu, M. Gilkey, B. Murphy, D. Vlachos, "Deciphering Complex Biomass Upgrade Processes on the Molecular Level", Department of Chemical Engineering, **Tianjin University**, Tianjin, CHN, 2015.
20. B. Xu, M. Gilkey, B. Murphy, D. Vlachos, "Deciphering Complex Biomass Upgrade Processes on the Molecular Level", Department of Chemical Engineering, **Tsinghua University**, Beijing, CHN, 2015.
21. B. Xu, M. Gilkey, B. Murphy, P. Panagiotopoulou, D. Vlachos, "Develop Renewable Pathways to Monomers with a Bottom-Up Approach", Department of Chemical Engineering, **Zhejiang University**, Hangzhou, CHN, 2014.

22. B. Xu, M. Gilkey, B. Murphy, P. Panagiotopoulou, D. Vlachos, "Achieve Mechanistic Understanding of Biomass Upgrade to Valuable Chemicals", Department of Chemistry, **Fudan University**, Shanghai, CHN, 2014.

Conferences

23. B. Xu, M. Dunwell, A. Malkani, X. Yang, "Distributed Ammonia Production via Electrochemical Nitrogen Reduction Reaction", 68th Canadian Chemical Engineering Conference, Toronto, CA, 2018.
24. B. Xu, N. Gould, "Developing the Tool Kit to Probe Liquid-Solid Interfaces in Biomass Upgrading", 17th National Young Scholar Catalysis Conference, Lanzhou, CHN, 2018.
25. B. Xu, J. Nash, X. Yang, J. Anibal, "Distributed Ammonia Production via Electrochemical Nitrogen Reduction Reaction", Electrochemical Society meeting, Seattle, WA, 2018.
26. B. Xu, B. Murphy, M. Letterio, "Identification of Active Sites for Methyl Lactate Dehydration on Faujasites", International Conference on Catalysis and Chemical Engineering, Baltimore, MD, 2017.
27. B. Xu, N. Gould, "Characterization and Quantification of Acid Sites on Zeolites in the Presence of Solvents", American Chemical Society Meeting, Washington DC, 2017.
28. B. Xu, M. Dunwell, Q. Lu, J. Heyes, J. Rosen, J. Chen, Y. Yan, F. Jiao, "Mechanistic Insights into the Electrochemical Reduction of CO_2 using In-Situ Surface Enhanced Spectroscopy", American Chemical Society Meeting, Washington DC, 2017.
29. B. Xu, N. Gould, "Characterization and Quantification of Acid Sites on Zeolites in the Presence of Solvents", ACS Award in Surface Science session, American Chemical Society Meeting, San Francisco, CA, 2017.
30. B. Xu, M. Dunwell, Q. Lu, J. Heyes, J. Rosen, J. Chen, Y. Yan, F. Jiao, "Mechanistic Insights into the Electrochemical Reduction of CO_2 Using In-situ Surface Enhanced Spectroscopy", American Chemical Society Meeting, San Francisco, CA, 2017.
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