Yangyang Liu, Ph.D.

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EDUCATION

2014 Ph.D. Chemistry, Texas A&M University, College Station, TX
Thesis Advisor: Prof. Hongcai Zhou
2009 B. S. Chemistry, Nankai University, Tianjin, China

ACADEMIC APPOINTMENTS

2021-Present Associate Professor (with early tenure), California State University, Los Angeles, CA
2016-2021 Assistant Professor, California State University, Los Angeles, CA
2014-2016 Postdoctoral Fellow, Northwestern University, Evanston, IL
Advisors: Prof. Joseph Hupp and Prof. Omar Farha

HONORS & AWARDS

2023 Department of Energy FAIR Award
2018 Department of Defense Army Research and Education Program Award
2017 ACS-PRF Undergraduate New Investigator
2015 2nd Prize in GLCACS Student/Postdoc Presentation Contest
2013 3rd Prize Poster Presentation in BASF-TAMU Graduate Student Symposium
2013 Eastman Chemical Travel Award
2008 Kwang-Hua Scholarship
2006, 2007 Excellent Student Scholarship

TEACHING EXPERIENCE

2016-present Assistant/Associate Professor, California State University, Los Angeles, CA
CHEM 3100 Writing for Chemists
CHEM/PHYS 4142 Chemistry and Physics of Materials
CHEM 3600 Inorganic Chemistry
CHEM 4810 Advanced Synthetic Methods
CHEM 4890 Molecular Sciences Capstone
CHEM 5600 Advanced Inorganic Chemistry

2009-2011 Graduate Teaching Assistant, Texas A&M University, College Station, TX
General Chemistry Laboratory I
General Chemistry Laboratory II
Advanced Inorganic Chemistry Laboratory

RESEARCH INTERESTS

Materials and inorganic chemistry, metal-organic frameworks, covalent-organic frameworks, functional materials, (photo)catalysis, renewable energy, environmental remediation, and biomedicine.

PUBLICATIONS & PATENTS

Published Articles in peer-reviewed journals

CSULA undergraduate authors are underlined, ‡CSULA master's student authors, #equal contribution, *corresponding author(s)

Publications from Independent Work at CSULA

40. Mishra, N. O.; Quon, A. S.; Nguyen, A.; Papazyan, E. K.; Hao, Y.; **Liu, Y.*** Constructing Physiological Defense Systems against Infectious Disease with Metal–Organic Frameworks: A Review, *ACS Appl. Bio Mater.* **2023**, *6*, 3052–3065
39. Luo, H.-B.*; Lin, F.-R.; Liu, Z.-Y.; Kong, Y.-R.; Idrees, K. B.; **Liu, Y.***, Zou, Y.; Farha, O. K.; Ren, X.-M. MOF–Polymer Mixed Matrix Membranes as Chemical Protective Layers for Solid-Phase Detoxification of Toxic Organophosphates, *ACS Appl. Mater. Interfaces* **2023**, *15*, 2933-2939.
38. Zhang, A.-A.; Li, Y.-L.; Fang, Z.-B.; Xie, L.; Cao, R.; **Liu, Y.***; Liu, T.-F.* Facile Preparation of Hydrogen-Bonded Organic Framework/Cu_2O Heterostructure Films via Electrophoretic Deposition for Efficient CO_2 Photoreduction. *ACS Appl. Mater. Interfaces* **2022**, *14*, 21050-21058.
37. Hao, Y.; Papazyan, E. K.; Ba, Y.; **Liu, Y.*** Mechanism-Guided Design of Metal–Organic Framework Composites for Selective Photooxidation of a Mustard Gas Simulant under Solvent-Free Conditions. *ACS Catal.* **2022**, *12*, 363-371.
36. Zhang, J.; Zhang, R.; **Liu, Y.**; Kong, Y.-R.; Luo, H.-B.; Zou, Y.; Zhai, L.; Ren, X.-M. Acidic Groups Functionalized Carbon Dots Capping Channels of a Proton Conductive Metal–Organic Framework by Coordination Bonds to Improve the Water-Retention Capacity and Boost Proton Conduction. *ACS Appl. Mater. Interfaces* **2021**, *13*, 60084-60091.
35. Kong, Y.-R.; Zhang, R.; Zhang, J.; Luo, H.-B.; **Liu, Y.**; Zou, Y.; Ren, X.-M. Microwave-Assisted Rapid Synthesis of Nanoscale MOF-303 for Hydrogel Composites with Superior Proton Conduction at Ambient-Humidity Conditions. *ACS Appl. Energy Mater.* **2021**, *4*, 14681-14688.
34. Liu, M.; Zhang, J.; Kong, Y.-R.; Luo, H.-B.*; **Liu, Y.**; Ren, X.-M.* Thin Films of an Ultrastable Metal–Organic Framework for Formic Acid Sensing with High Selectivity and Excellent Reproducibility. *ACS Materials Lett*. **2021**, *3*, 1746–1751.
33. Zhang, J.; He X.; Kong, Y.-R.; Luo, H.-B.*; Liu, M.; **Liu, Y.**; Ren, X.-M.* Efficiently Boosting Moisture Retention Capacity of Porous Superprotonic Conducting MOF-802 at Ambient Humidity via Forming a Hydrogel Composite Strategy. *ACS Appl. Mater. Interface* 2021, *13*, 37231-37238.
32. #Hao, Y.; #Liu, B. M.; Bennett, T. F.; Monsour, C. G.; Selke, M.*; **Liu, Y.*** Determination of Singlet Oxygen Quantum Yield of a Porphyrinic Metal–Organic Framework. *J. Phys. Chem. C* **2021**, *125*, 7392-7400.
31. Luo, H.-B.; ‡Castro, A. J.; Wasson, M. C.; Flores, W.; Farha, O. K.; **Liu, Y.*** Rapid, Biomimetic Degradation of a Nerve Agent Simulant by Incorporating Imidazole Bases into a Metal-Organic Framework. *ACS Catal.* **2021**, 11, 1421-1429.
30. Zhang, X.; Wasson, M. C.; Shayan M.; Berdichevsky, E. K.; Ricardo-Noordberg, J.; Singh, Z.; Papazyan, E. K.; ‡Castro, A. J.; Marino, P.; Ajoyan, Z.; Chen, Z.; Islamoglu, T.; Howarth, A. J.*; **Liu, Y.***; Majewski, M. B.*; Katz, M. J.*; Mondloch, J. E.*; Farha, O. K.* A Historical Perspective on Porphyrin-based Metal-Organic Frameworks and Their Applications. *Coord. Chem. Rev.* **2020**, *429*, 213615.
29. Klein, S. E.; ‡Sosa, J. D.; Castonguay, A. C.; Flores, W. I.; Zarzar, L. D.*; **Liu, Y.*** Green Synthesis of Zr-Based Metal-Organic Framework Hydrogel Composites and Their Enhanced Adsorptive Properties. *Inorg. Chem. Front*. **2020**, *7*, 4813-4821.
28. Luo, H.-B.; Ren, Q.; **Liu, Y.***; Zhang, J.; Ren, X. M.* Proton Conduction of an Acid-Resistant Open-Framework Chalcogenidometalate Hybrid in Anhydrous versus Humid Environments. *Inorg. Chem.* **2020**, *59*, 7283–7289.
27. ‡Ilacas, G. C.; Basa, A.; Nelms, K. J.; Sosa, J. D.; **Liu, Y.***; Gomez, F. A.* Paper-based microfluidic devices for glucose assays employing a metal-organic framework (MOF). *Anal. Chim. Acta.* **2019**, *1055*, 74-80.
26. Cagan, D. A.; ‡Garcia, A. C.; ‡Li, K.; ‡Ashen-Garry, D.; ‡Tadle, A. C.; Zhang, D.; Nelms, K. J., **Liu, Y.**, Shallenberger, J. R., Stapleton, J. J., Selke, M. Chemistry of Singlet Oxygen with a Cadmium−Sulfur Cluster: Physical Quenching versus Photooxidation. *J. Am. Chem. Soc.* **2019**, *141*, 67−71
25. Pereira, C. F.; **Liu, Y.**; Howarth, A.; Figueira, F.; Rocha, J.; Hupp, J. T.; Farha, O. K.; Tome, J. P. C.; Paz, F.

A. A. Detoxification of a Mustard-Gas Simulant by Nanosized Porphyrin Based Metal−Organic Frameworks. *ACS Appl. Nano Mater.* **2019**, *2*, 465-469.

24. Sosa, J. D.; Bennett, T. F.; Nelms, K. J.; Liu, B. M.; ‡Tovar R. C.; **Liu, Y.***. Metal-Organic Framework Hybrid Materials and Their Applications", *Crystals*, **2018**, *8*, 325.

Publications Prior to CSULA

23. Garcia-Holley, P.; Schweitzer, B.; Islamoglu, T.; **Liu, Y.**; Lin, L.; Rodriguez, S.; Weston, M. H.; Hupp, J. T.; Gómez-Gualdrón, D. A.; Yildirim, T.; Farha, O. K. Benchmark Study of Hydrogen Storage in Metal-Organic Frameworks under Temperature and Pressure Swing Conditions. *ACS Energy Lett.* **2018**, 3(3), 748-754.
22. **Liu, Y.**; Howarth, A. J.; Vermeulen, N.A.; Moon, S. Y.; Hupp, J. T.; Farha, O. K. Catalytic Degradation of Chemical Warfare Agents and Their Simulants by Metal-Organic Frameworks. *Coord. Chem. Rev.* **2017***, 346,* 101-111.
21. Howard, A. J.; Buru, C. T.; **Liu, Y.**; Ploskonka, A. M.; Hartlieb, K. J.; McEntee, M.; Mahle, J. J.; Buchanan, J. H.; Durke, E. M.; Al-Juaid, S. S.; Stoddart, J. F.; DeCoste, J. B.; Hupp, J. T.; Farha, O. K. Postsynthetic incorporation of a Singlet Oxygen Photosensitizer in a Metal-Organic Framework for Fast and Selective Oxidative Detoxification of Sulfur Mustard. *Chem. Eur. J.* **2017**, *23*, 214-218.
20. **Liu, Y.**[#]; Buru, C. T.[#]; Howarth, A. J.; Mahle, J. J.; Buchanan, J. H.; DeCoste, J. B.; Hupp, J. T.; Farha, O. K. Efficient and Selective Oxidation of Sulfur Mustard using Singlet Oxygen Generated by a Pyrene-based Metal-Organic Frameworks. *J. Mater. Chem. A.* **2016***, 4,* 13809-13813
19. Xu, Y.; Vermeulen, N. A.; **Liu, Y.**; Hupp, J. T.; Farha, O. K. SALE-Ing a MOF-Based "Ship of Theseus." Sequential Building-Block Replacement for Complete Reformulation of a Pillared-Paddlewheel Metal-Organic Framework. *Eur. J. Inorg. Chem*. **2016**, 4345-4348.
18. **Liu, Y.**; Klet, R. C.; Hupp, J. T.; Farha, O. K. Probing the Correlations Between the Defects in Metal-Organic Frameworks and Their Catalytic Activity by an Epoxide Ring-opening Reaction. *Chem. Commun.* **2016**, *52*, 7806-7809.
17. Howarth, A. J.[#]; **Liu, Y.**[#]; Li, P.; Li, Z.; Wang, T. C.; Hupp, J. T.; Farha, O. K. Chemical, Thermal and Mechanical Stabilities of Metal-Organic Frameworks. *Nat. Rev. Mater.* **2016**, *1*, 15018.
16. Thornburg, N. E.; **Liu, Y.**; Li, P.; Hupp, J. T.; Farha, O. K.; Notestein, J. M. MOFs and Their Grafted Analogues: Regioselective Epoxide Ring-opening with Zr_6 Nodes. *Catal. Sci. Technol.* **2016**, *6,* 6480-6484.
15. Klet, R. C.; **Liu, Y.**; Wang, T. C.; Hupp, J. T.; Farha, O. K. Evaluation of Brønsted Acidity and Proton Topology in Zr- and Hf-based Metal-Organic Frameworks Using Potentiometric Acid-Base Titration. *J. Mater. Chem. A.* **2016***, 4,* 1479-1485.
14. Platero-Prats, A.; Mavrandonakis, A. M.; Gallington, L. C.; **Liu, Y.**; Hupp, J. T.; Farha, O. K.; Cramer, C. J.; Chapman, K. W. Structural Transitions of the Metal-Oxide Nodes within Metal-Organic Frameworks: On the Local Structures of NU-1000 and UiO-66. *J. Am. Chem. Soc.* **2016**, *138*, 4178-4185.
13. **Liu, Y.**; Moon, S.-Y.; Hupp, J. T.; Farha, O. K. Dual-Function Metal-Organic Framework as a Versatile Catalyst for Detoxifying Chemical Warfare Agent Simulants. *ACS Nano.* **2015***, 9,* 12358-12364.
12. **Liu, Y.**[#]; Howarth, A. J.[#]; Hupp, J. T.; Farha, O. K. Selective Photooxidation of a Mustard-Gas Simulant Catalyzed by a Porphyrinic Metal-Organic Framework. *Angew. Chem. Int. Ed.* **2015**, *54,* 9001-9005.
11. Moon, S.-Y.[#]; **Liu, Y.**[#]; Hupp, J. T.; Farha, O. K. Instantaneous Hydrolysis of Nerve-Agent Simulants with a Six-Connected Zirconium-Based Metal-Organic Framework. *Angew. Chem. Int. Ed.* **2015**, *54*, 6795-6799.
10. Wang, S.; Morris, W.; **Liu, Y.**; McGuirk, M.C.; Zhou, Y.; Hupp, J. T.; Farha, O. K.; Mirkin, C. A. Surface-Specific Functionalization of Nanoscale Metal-Organic Frameworks. *Angew. Chem. Int. Ed.* **2015***, 54, 14738-14742*.
9. Howarth, A. J.; **Liu, Y.**; Hupp, J. T.; Farha, O. K. Metal-Organic Frameworks for Applications in Remediation of Oxyanion/Cation-contaminated Water. *CrystEngComm.* **2015**, *17*, 7245-7253.
8. Chen, Y.-P.; **Liu, Y.**; Liu, D.; Bosch, M.; Zhou, H.-C. Direct Measurement of Adsorbed Gas Redistribution in Metal-Organic Frameworks. *J. Am. Chem. Soc.* **2015**, *137*, 2919-2930.
7. Beyzavi, M. H.[#]; Stephenson, C.[#]; **Liu, Y.**[#]; Hupp, J. T.; Farha, O. K. Metal-Organic Framework-based Catalysts: Chemical Fixation of CO_2 with Epoxides leading to Cyclic Organic Carbonates. *Front. Energy. Res.* **2015**, *2*, 63.
6. Liu, T.-F.; Zou, L.; Feng, D.; Chen, Y.-P.; Fordham, S.; Wang, X.; **Liu, Y.**; Zhou, H.-C. Stepwise Synthesis of Robust Metal-Organic Frameworks via Postsynthetic Metathesis and Oxidation of Metal Nodes in a

Single-Crystal to Single-Crystal Transformation. *J. Am. Chem. Soc.* **2014**, *136*, 7813-7816.

5. Xie, Y.; Yang, H.; Wang, U. Z.; **Liu, Y.**; Li, J.-R.; Zhou, H.-C. Unusual Preservation of Polyhedral Molecular Building Units in a Metal-Organic Framework with Evident Desymmetrization in Ligand Design. *Chem. Comm.* **2014**, *50*, 563-565.
4. Zhang, M.; Lu, W.; Li, J.-R.; Bosch, M.; Chen, Y.-P.; Liu, T.-F.; **Liu, Y.**; Zhou, H.-C. Design and synthesis of nucleobase-incorporated metal-organic materials. *Inorg. Chem. Front.* **2014**, *1*, 159-162.
3. **Liu, Y.**; Chen, Y.-P.; Liu, T.-F.; Yakovenko, A. A.; Raiff, A. M.; Zhou, H.-C. Selective Gas Adsorption and Unique Phase Transition Properties in a Stable Magnesium Metal-Organic Framework Constructed from Infinite Metal Chains. *CrystEngComm.* **2013***, 15,* 9688-9693.
2. **Liu, Y.**; Li, J.-R.; Verdegaal, W. M.; Liu, T.-F.; Zhou, H.-C. Isostructural Metal-Organic Frameworks Assembled from Functionalized Di-isophthalate Ligands through a Ligand Truncation Strategy. *Chem. Eur. J.* **2013**, *19,* 5637-5643.
1. **Liu, Y.**; Wang, U. Z.; Zhou, H.-C. Recent Advances in Carbon Dioxide Capture with Metal-Organic Frameworks. *Greenhouse Gas Sci. and Technol.* **2012**, *2*, 239-259.

Patent

Farha, O. K.; Hupp, J. T.; Beyzavi, H. M.; Stephenson, C. J.; **Liu, Y.** Zirconium- and Hafnium-Based Metal-Organic Frameworks as Epoxide Ring-Opening Catalysts. US Patent *US20170362167A1*.

EXTERNAL GRANT FUNDING

2023-2026	Department of Energy (DOE), "Designing Photoresponsive Nanosponges for Efficient and Reversible Capture and Release of Carbon Dixoide." (Role: PI)	$750,000
2023-2025	DOE, "Developing Highly Porous Metal-Organic Frameworks and Composite Materials for Hydrogen Storage." (Role: PI)	$300,000
2022-2023	DOE, "R&D Scoping Study and Infrastructure Self-Assessment of Fossil Energy and Carbon Management Based Research Capabilities for California State University, Los Angeles." (Role: PI)	$200,000
2022-2027	National Science Foundation (NSF), "HSI Implementation and Evaluation Project: Increasing participation and persistence in STEM by incorporating field-based experiences in the urban environment." (Role: Co-PI; PI: René Vellanoweth)	$815,523
2022-2027	National Science Foundation (NSF) "CREST Center for Advancement toward Sustainable Urban Systems (CATSUS)" (Role: Senior Personnel; PI: Dr. Arturo Pacheco-Vega)	$5,000,000
2016-2022	NSF "CREST Center for Energy and Sustainability" (Role: Co-PI; PI: Dr. Arturo Pacheco-Vega)	$4,999,999
2018-2022	Department of Defense, Army Research Office "Multifunctional Metal-Organic Frameworks for Efficient Degradation of Chemical Warfare Agents: Mechanism and Synthesis" (Role: PI)	$600,000
2017-2020	ACS PRF "Mechanism-Guided Design and Synthesis of Metal-Organic Frameworks with Optimized Pores for Methane Storage" (Role: PI)	$55,000
2017-2019	NSF "Supplement—Partnership of CREST at California State University-Los Angeles with Northwestern University: Solid-State Supramolecular Crystals for Photovoltaic Cells" (Role: PI)	$99,997
2017-2018	La Kretz Environmental Endowment "Reducing Air Pollution by Designing the Next-Generation Catalytic Converter Integrated with a Filtration System" (Role: PI)	$7,000

2017-2018	COAST Grant Development Program Award "Contaminant-selective sponges for removal of ocean toxins" (Role: Co-PI; PI: Dr. Monica So)	$19,030

INTERNAL RESERACH FUNDING

2021-2022	Provost Research Fund at CSULA "Developing Porous Nanoparticles for Tumor-Targeted Drug Delivery" (Role: PI)	$8,000
2017-2018	CSU Research, Scholarship, and Creative Activity (RSCA) Program at CSULA "Investigating Porphyrinic Materials for the Degradation of Sulfur Mustard" (Role: PI)	$5,000
2017-2018	NSF PREM SEED grant at CSULA "Investigating Porous Materials for Hydrogen Storage Applications" (Role: PI)	$7,500

SELECTED PRESENTATIONS & INVITED SEMINARS

1. *Liu, Y.* "Programmable Porous Materials for Catalysis and Sustainable Energy", Invited Speaker, University of Southern California, Inorganic Chemistry Seminar Series, Jan. 2024
2. *Liu, Y.* "Designing Metal-Organic Frameworks Composites for the Removal and Degradation of Toxic Chemicals", Invited Speaker, 2nd Annual Texas Pore Engineering Conference, Oct. 2023
3. *Liu, Y.* "Porous Framework Materials for the Removal of Emerging Contaminants from Aqueous Environments", ACS Fall 2022 National Meeting, Invited speaker, Aug. 2022
4. *Liu, Y.* "Optimizing Metal-Organic Frameworks for Catalysis" IUPAC/ Canadian Chemistry Conference and Exhibition, Invited speaker, Virtual, Aug. 2021
5. *Liu, Y.* "Optimizing Metal-Organic Framework Catalysts for the Detoxification of Chemical Warfare Agents", ACS Spring 2021 National Meeting, Virtual, Apr. 2021
6. *Liu, Y.* "Synthesis and enhanced performance of metal–organic framework hybrid materials", ACS Fall 2019 National Meeting, San Diego, California, Aug. 2019
7. *Liu, Y.* "Multifunctional Metal-Organic Frameworks: from Catalysis to Solar Cells", Invited Seminar Series Speaker, Seminar in Interdisciplinary STEM Research, California State University, Los Angeles. Apr. 2018
8. *Liu, Y.* "Multifunctional Metal-Organic Frameworks: from Catalysis to Solar Cells", Invited Seminar Series Speaker, California State University, Long Beach, California, Nov. 2017
9. *Liu, Y.* "Multifunctional Metal-Organic Frameworks: from Catalysis to Solar Cells", Invited Seminar speaker, Oak Crest Institute of Science in Monrovia, California, Sep. 2017
10. *Liu, Y.* "Efficient and selective oxidation of sulfur mustard using singlet oxygen generated by a pyrene-based metal-organic framework", ACS National Meeting & Exposition in San Francisco, California, Apr. 2017
11. *Liu, Y.* "Nanoporous Metal-Organic Frameworks: New Opportunities for Catalysis". Invited talk. The Synfuels China Laboratory for Fundamental Catalysis, Beijing, China. Jan. 2016

AFFILIATIONS & SERVICES

Member, American Chemical Society

Journal Reviewer, Journal of American Chemical Society, Angewandte Chemie, Chemical Society Reviews, ACS Applied Materials & Interfaces, Chemistry of Materials, Inorganic Chemistry, Energy & Fuels, Polymers, Inorganica Chimica Acta, Materials Letters, Frontiers in Chemistry, RSC Advances, Photochemistry and Photobiology, Nature Water Review.

Proposal Reviewer, Department of Energy, National Science Foundation, American Chemical Society Petroleum Research Fund, Research Corporation for Science Advancement, COAST Grant Development Program, Beckman Young Investigator.