Hao Li (1992/06)

Department of Chemistry, Temple University, Philadelphia, 19122, United States. Email: <u>tur08505@temple.edu</u> Email in China: <u>lihao@ahnu.edu.cn, haoli.tu@gmail.com</u> Linkedin: <u>https://www.linkedin.com/in/hao-li-b43602275/</u> Google scholar: <u>https://scholar.google.com/citations?user=gYlagLAAAAAJ</u>

Profession experience and Education

 Department of Chemistry, Temple University

 Postdoctoral fellow

 Laboratory website:
 <u>https://sites.temple.edu/borguet/</u>

Department of Physics, Anhui Normal University. Assistant Professor

School of Material and Chemistry, Anhui Normal UniversityPostdoctoral fellowLaboratory website:https://physics.ahnu.edu.cn/luzhou/

Supervisor: Prof. Zhou Lu

Supervisor: Prof. Eric Borguet

Department of Chemical Physics, University of Science and Technology of China Ph.D. in **Chemical Physics** Supervisor: *Prof. Shan Xi Tian* Laboratory website: <u>http://staff.ustc.edu.cn/~sxtian/</u>

Chao Hu University B.S. in **Physics**

Research Interests

Tracking and manipulating (ultrafast) dynamics for Catalysis, Photocatalysis, and Photodynamic Therapy towards tailored purposes:

1. Afterglow photocatalysis for decomposition of toxic chemicals and bio-mimetic chemistry.

2. Carrier dynamics in both bulk and surface, including energy transfer, electron separation, and conformational reorganizations induced by energetic excitons on the catalyst's surface.

3. **Rational designs of bio-compatible molecular medicines** for photodynamic therapy based on a deep understanding of chemical dynamics of structure-interaction-function interplay.

Research experience

1. *Participation in the construction of a* high energy-resolution imaging spectrometer was established to *study vibrational and steric effects* in *gas-phase dissociative electron attachment*.

2. *Excited-state dynamics* of triplet photosensitizer and photocatalyst for CO₂ Reduction Reaction (CRR) by *femtosecond transient absorption spectroscopy*.



3. *Identification of long-lived intermediate in CRR* on the surface of plasmonic photocatalyst, such as Pd/Au@Pd core-shell nanoparticle by *femtosecond broadband sum frequency generation*. (Push the detection limit towards in-operando catalysis.)

Funding (PI)

1. Anhui Normal University Scientific Research Start-up Fund, 100 k (CNY).

2. Natural Science Fund of Education Department of Anhui province (KJ2020A0053), 60 k (CNY).

Skills and Techniques

✓ Scripting with:

Numerical computation (Linux, C/C++, Python, MatLAB, Mathematica, CMIstark).
Simulation (Gaussian, Simion, Comsol MultiPhysics).
Machine design (SolidWorks).
Automation and data acquisition (MatLAB, LabVIEW).
Data analysis (Origin, Igor, MatLAB, Glotaran).

✓ Skillful in:

Ultralow energy electron beam (0 - 30 eV), crossed-beam (electron, ion, molecular beam) technique, time-sliced velocity map imaging method, photoelectron spectrometry, laser daily maintenance, broadband mid-IR laser source, femtosecond NIR-SHG/-SFG, (Time-resolved) femtosecond broadband sum frequency generation vibrational and electronic spectroscopy, femtosecond transient absorption spectroscopy and temperature programmed desorption-mass/IR spectroscopy.

Referees

Prof. Shan Xi Tian

Department of Chemical Physics, University of Science and Technology of China, Hefei, China. <u>sxtian@ustc.edu.cn</u>

Prof. Zhou Lu

School of Physics and Electronic Information, Anhui Normal University, Wuhu, China.

Prof. Eric Borguet

Department of Chemistry, Temple University Philadelphia, Pennsylvania, United States

List of publications (26 papers, 165 citations, h-index: 8)

33. **Hao Li**, Somaiyeh Dadashi, Eric Borguet*. Progress in on-water catalysis: oil droplets and water droplets. (*In preparation*).

32. Hao Li, Sharan Dhar, Eric Borguet. Progress in afterglow photocatalysis and design strategy towards persistent photocatalyst. (*In preparation*).

zhoulu@ahnu.edu.cn

eborguet@temple.edu

31. **Hao Li**, Lauren Towers, Sharan Dhar, Eric Borguet*. Unexpected chemistry in Solvent exchange with chloroform for UiO- metal-organic frameworks activation. (*In preparation*).

30. **Hao Li**, Sharan Dhar, Zoe Sollis, Lauren Towers, Edward Jang, Nathaniel L. Rosi* and Eric Borguet*. Intrinsic frustrated Lewis pair by ortho-amine functionalization in UIO-68 metal-organic framework gives unusual adsorption behavior of chemical warfare agent simulant. (*In preparation*).

29. Hao Li, Somaiyeh Dadashi, Eric Borguet*. Generalized description for interfacial dielectric constant on the polar medium. (*In preparation*).

28. Hao Li, Sharan Dhar, Jessica Azele Kolora, Venkata Swaroopa Datta Devulapalli, and Eric Borguet*. Electrostatic repulsion promoted electron mobility boosting efficient afterglow photocatalysis. *J. Am. Chem. Soc.* (In preparation)

27. **Hao Li**^{a,*}, Juan-Juan Zhang^b, Yue-Tong Fang^a, Yu-Min Wang^a, Gui-Yuan Wu^{a,*}, Zheng-gang Lan^{b,*} and Zhou Lu^{a,*}, Polarity-dependent intersystem crossing forges unusual anti-solvatochromic fluorescent probes. *Chem. Science* (Submitted). Corresponding author.

26. Daochuan Jiang#, Zhongfei Li#, Hao Li#, Yingpeng Cheng, Haiwei Du, Chuhong Zhu, Lingchen Meng, Yuetong Fang, Chunyi Zhao, Zaizhu Lou, Zhou Lu*, Yupeng Yuan*. Achieving Long-Lived Charge Separated State through Ultrafast Interfacial Hole Transfer in Redox Sites-Isolated CdS Nanorods for Enhanced Photocatalysis. *Small*, 2310414 (2024).

25. Somaiyeh Dadashi, Hao Li, Bijoya Mandal, Eric Borguet. NIR-vSHG: A new nonlinear vibrational spectroscopy of interfaces. *Advanced Solid State Lasers*, JTu5A, 14 (2023). Conference paper.

24. Guiyuan Wu*; Huimin Zhu; Hao Li; Kai Zhang; Xianyi Zhang; Dong Yan; Xiudu Zhang; Lili Lin*; Zhou Lu*. The Impact of Aggregation of AIE and ACQ Moiety-Integrating Material on the Excited State Dynamics. *RSC Advances* **13**, 33911-33917 (2023).

23. Le Luo[#], Hao Li[#], Zhou Lu^{*}, Zhenghua Wang^{*}, Boosting Carrier–Phonon Scattering in Cu2–xS Nanochains for 90.5% Photothermal Conversion Efficiency in Near-Infrared II Region. *J. Phys. Chem. Lett.* 14, 5531-5536 (2023). Contributed equally.

22. Xuting Dong^{a, 1}, Guangcheng Wu^{b, 1}, Guanglei Cui^a, Hao Li^{a,c}, Yarong Shen^a, Hengli He^d, Nian

Liu^a, Zewen Zuo^a, Min Gu^e. Boosting efficiency and stability with KBr interface modification for NiOx-based inverted perovskite solar cells. *Mater. Sci. in Semicond. Process.* 160,107454 (2023).

21. Liang Zhu,[#] Daochuan Jiang, [#] Zhifu Liang, [#] Hao Li,[#] Haiwei Du, Chuhong Zhu, Huiquan Li^{*}, Zhou Lu^{*}, Yupeng Yuan^{*}, A π -Conjugated van der Waals Heterostructure between Single-Atom Nianchored Salphen-Based Covalent Organic Framework and Polymeric Carbon Nitride for HighEfficiency Charge Separation. *Small* 2301017, (2023). [#] Contributed equally.

20. Yanan Bo[#], Pengye Du[#], Hao Li[#]; Rong Liu, Chengming Wang, Hengjie Liu, Dong Liu, Tingting Kong, Zhou Lu, Chao Gao^{*}, Yujie Xiong^{*}, Bridging Au nanoclusters with ultrathin LDH nanosheets via ligands for enhanced charge transfer in photocatalytic CO₂ reduction, *Appl. Catal. B: Environ.* (2023). [#], Contributed equally.

19. Ziye Zhang[†]; Liteng Ren[†]; Hao Li[†]; Yuetong Fang; Daochuan Jiang; Haiwei Du; Gengsheng Xu; Chuhong Zhu; Huiquan Li^{*}; Zhou Lu^{*}; and Yupeng Yuan^{*}, π -Conjugated in-plane heterostructure enable long-lived shallow trapping in graphitic carbon nitride for increased photocatalytic hydrogen generation. *Small.* 2207173 (2023). [†] Contributed equally.

18. Can-yu Hu, Xing Chen, Jing-xiang Low, Yaw-Wen Yang, Hao Li, Di Wu, Shuang-ming Chen, Jian-bo Jin, He Li, Huan-xin Ju, Chia-Hsin Wang, Zhou Lu, Ran Long^{*}, Li Song, Yu-jie Xiong^{*}, Near-infrared-featured broadband CO₂ reduction with water to hydrocarbons by surface plasmon. *Nat. Comm.* 14 (1), 221 (2023).

17. Junjun Wang^{a,†}, **Hao Li**^{b,†}, Yicai Zhu^a, Mingdi Yang^c, Jing Huang^c, Xiaojiao Zhu^a, Zhipeng Yu^a, Zhou Lu^{b,*}, and Hongping Zhou ^{a, *}, Unveiling Upsurge of Photogenerated ROS: Prolong Exciton Lifetime through Tuning Aggregates. *Chem. sci.* 14, 323- 330(2023). [†], Contributed equally.

16. Mei-Lin Duan^{a,†}, Can-Yu Hu^{a,†}, **Hao** Li^{b,†}, Yi-Hong Chen^a, Rui-Tian Chen^a, Wan-Bing Gong^a, Zhou Lu^{b,*}, Ning Zhang, Ran Long^{a,*}, Li Song^{a,*} and Yu-Jie Xiong^{a,*}, Synergizing Inter- and Intraband Transitions in Defective Tungsten Oxide for Efficient Photocatalytic Alcohol Dehydration to Alkene. *J. Am. Chem. Soc. Au* 2, 5, 1160-1168 (2022). [†] Contributed equally.

15. Shengnan Wang^a, Mengtao Rong^a, Hao Li^b, Tianren Xu^a, Yingcui Bu^a, Lei Chen^a, Xiaoqin Chen^a, Zhipeng Yu^{a, *}, Xiaojiao Zhu^a, Zhou Lu^{b,*} and Hongping Zhou^{a,*}, Unveiling Mechanism of Organic Photogenerator for Hydroxyl Radicals Generation by Molecular Modulation, *Small* 152, 2104857 (2022).

14. Qingyan Pan¹, Xinsheng Chen¹, Hao Li³, Siqi Chen¹, Xuhan Zheng¹, Hui Liu¹, Bo Li^{4,2} and Yingjie Zhao^{4,1}. Preparation of crystalline benzotrithiophene-based two-dimensional graphdiyne analogue. *2D Mater.* 9014001 (2022).

13. Gui-Yuan Wu,* Chao Liang, Hao Li, Xianyi Zhang, Guanxin Yao, Fan-Fan Zhu, Yi-Xiong Hu, Guang-Qiang Yin, Wei Zheng*c and Zhou Lu*, A multi-responsive supramolecular heparin-based biohybrid metallogel constructed by controlled self-assembly based on metal–ligand, host–guest and electrostatic interactions. *Org. Chem. Front.* 8 (13), 4715-4722 (2021).

12. Ziyuan Li, Ziwei Chen, Jie Hu, Hao Li, Shan Xi Tian^{*}. A new experimental method for investigations on microstructure of liquid-vapor interface. *Chinese J. Chem. Phys.* 34, 43 (2021).

11. Xiao-Fei Gao, Jing-Chen Xie, Hao Li, Xin Meng, Yong Wu and Shan Xi Tian^{*}. Direct observation of long-lived cyanide anions in superexcited states. *Commun. Chem.* 4: 13 (2021).

10. Xiao-Fei Gao^{a,†}, Feng An^{b,†}, Hao Li^a, Jing-Chen Xie^a, Xu-Dong Wang^a, Xin Meng^a, Bin Wu^a, Dai-Qian Xie^{b,*} and Shan Xi Tian^{a,*}, Probing the Potential Energy Surfaces of BrCN⁻ by Dissociative Electron Attachment, *J. Phys. Chem. Lett.* 11(21): 9110-9116 (2020).

9. Ziwei Chen, Cen-Feng Fu, Ziyuan Li, Jie Hu, Hao Li, Jinlong Yang and Shan Xi Tian^{*}. Identifying the Molecular Orientation and Clusters in Liquid-Vapor Interface of 1-Propanol by Time-Delayed Mass Spectrometry. *J. Phys. Chem. Lett.* 11(18):7510-7516 (2020).

8. Xin Meng, Bin Wu, Xiao-Fei Gao, Jing-Chen Xie, Hao Li, Yuanqin Yu, Dong-Feng Zhao, Shan Xi Tian^{*}. Vibrationally resolved photoemissions of N2 (C3 Π u \rightarrow B3 Π g) and CO (b3 Σ + \rightarrow a3 Π) by low-energy electron impacts, *J. Chem. Phys.* 153 (2):024301 (2020)

7. Xiao-Fei Gao; **Hao Li**; Xin Meng; Jing-Chen Xie; Shan Xi Tian^{*}; Synchronous and asynchronous dynamics of the concerted three-body dissociations of temporary negative ion CH₂F₂⁻, *J. Chem. Phys.* 152 (8): 084305 (2020).

6. Xu-Dong Wang, Xiao-Fei Gao, Hao Li, Bin Wu and Shan-Xi Tian^{*}, Dissociative electron attachment to polyatomic molecules, *J. Phys.: Conf. Ser.* 1412, 052010 (2020).

5. Hao Li, Xiao-Fei Gao, Xin Meng, Shan Xi Tian^{*}. Dissociative Electron Attachment to Molecular Acetonitrile. *J. Phys. Chem. A* 123, 9089-9095 (2019).

4. **Hao Li**, Xiao-Fei Gao, Xin Meng, Shan Xi Tian^{*}. Dissociative electron attachment to vibrationally excited CO₂. *Phys. Rev. A* 99, 032703 (2019).

3. Xiao-Fei Gao, Hao Li, Xin Meng, Shan Xi Tian^{*}. Ion-pair dissociations of BrCN by electron impacts. *Chinese J. Chem. Phys.* 32, 89-92 (2019).

2. Meng-Yang Li, Xiao-Fei Gao, Xu-Dong Wang, Hao Li, Shan Xi Tian^{*}. S⁻ velocity images of dissociative electron attachment to OCS. *Int. J. Mass Sprectrom.* 404, 20-23 (2016).

1. Chuan-jin Xuan, Xu-dong Wang, Lei Xia, Bin Wu, Hao Li, Shan-xi Tian^{*}. Dissociative Electron Attachment to 1,2-Dichlorobenzene using Mass Spectrometry with Phosphor Screen. *Chinese J. Chem. Phys.* 27, 628 (2014).