

Short CV:

Hao Zhang is currently an associate professor in Department of Chemistry at Tsinghua University, Beijing, China. He received his B.S. and M.S. in Chemistry at Tsinghua University in 2007 and 2010, under the supervision of Prof. Jinghong Li. He obtained his Ph.D. in Chemistry at University of Chicago in 2015, followed by a short postdoctoral work at the same place, under the supervision of Prof. Dmitri V. Talapin. He continued his postdoctoral study in Prof. John A. Rogers group at Northwestern University (Apr 2016 to Dec 2018).

Hao joined Department of Chemistry at Tsinghua University as an associate professor in Jan 2019.

His research interests include surface chemistry-mediated 2D/3D patterning of nanomaterials, integrated optoelectronic devices, and their applications as implantable bioelectronics.

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RESEARCH INTEREST

Surface chemistry-mediated 2D/3D patterning of nanomaterials
Flexible optoelectronics at biointerface

EDUCATION

- | | | | |
|--|-----------------------------------|-----------|--------------|
| 09.2010–12.2015 | University of Chicago, USA | Chemistry | Ph.D. |
| Research Advisor: <i>Prof. Dmitri V. Talapin</i> | | | |
| Thesis: <i>Inorganic Surface Chemistry of Colloidal Nanocrystals: Design of the Interface between Nanocrystals and Surrounding Media</i> | | | |
| 08.2007–07.2010 | Tsinghua University, China | Chemistry | M.S. |
| Research Advisor: <i>Prof. Jinghong Li</i> | | | |
| Thesis: <i>Photoelectrochemical Properties of Chemically Modified Nanomaterials</i> | | | |
| 08.2003–07.2007 | Tsinghua University, China | Chemistry | B.S. |

PROFESSIONAL EXPERIENCE

- | | |
|--|--------------------------------|
| 01.2019–Present | Tsinghua University |
| Associate Professor, Department of Chemistry | |
| 04.2016–12.2018 | Northwestern University |
| Postdoctoral researcher under <i>Prof. John A. Rogers</i> | |
| 01.2016–04.2016 | University of Chicago |
| Postdoctoral researcher under <i>Prof. Dmitri V. Talapin</i> | |

AWARDS & HONORS

- | | |
|-----------|---|
| 2016 | The <i>Yang Cao-Lan-Xian</i> Best Thesis Award in Organic/Inorganic Chemistry, University of Chicago |
| 2014 | Chinese Government Award for Outstanding Self-Financed Students Abroad |
| 2010–2012 | McCormick Fellowship, University of Chicago |
| 2012 | “Science and Technology Award of Higher Education of China (First Class), Ministry of Education, China”, rank 7 th in all contributors |
| 2011 | “The Top 100 Most-Influential Research Articles in China, 2010”, First author |
| 2010 | Honored M.S. Graduate of Tsinghua University |
| 2010 | Honored M.S. Thesis of Tsinghua University |
| 2007 | Honored B.S. Graduate of Tsinghua University |

PUBLICATIONS

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Book chapters

1. **H. Zhang**, P. Gutruf, J.A. Rogers*. Flexible Inorganic Light Emitting Diodes Enabled by New Materials and Designs, With Examples of Their Use in Neuroscience Research. ***Inorganic Flexible Optoelectronics: Materials and Applications***. (Invited book chapter, Wiley-VCH Verlag GmbH & Co.)

Peer reviewed journal articles

1. F. Li⁺, S.-F. Liu⁺, W. Liu⁺, Z.-W. Hou, J. Jiang, Z. Fu, S. Wang, Y. Si, S. Lu, H. Zhou, D. Liu, X.

- Tian, H. Qiu, Y. Yang, Z. Li, X. Li, L. Lin*, H.-B. Sun*, **H. Zhang***, J. Li*. 3D Printing of Inorganic Nanomaterials by Photochemically Bonding Colloidal Nanocrystals. **Science** 2023, **381**, 1468.
2. Z. Fu, L. Zhou, Y. Yin, K. Weng, F. Li, S. Lu, D. Liu, W. Liu, L. Wu, Y. Yang, H. Li, L. Duan, H. Xiao, **H. Zhang***, J. Li*. Direct Photo-Patterning of Efficient and Stable Quantum Dot Light Emitting Diodes via Light-Triggered, Carbocation Enabled Ligand Stripping. **Nano Lett.** 2023, **23**, 2000.
 3. H. Qiu, F. Li, S. He, R. Shi, Y. Han, H. Abudukeremu, L. Zhang, Y. Zhang, S. Wang, W. Liu, C. Ma, H. Fang, R. Long*, K. Wu, **H. Zhang***, J. Li. Epitaxial CsPbBr₃/CdS Janus Nanocrystal Heterostructures for Efficient Charge Separation. **Adv. Sci.** 2023, **10**, 202206560.
 4. S. Wang, S. Lu, X. Tian, W. Liu, Y. Si, Y. Yang, H. Qiu, **H. Zhang***, J. Li. A general approach to stabilize nanocrystal superlattices by covalently bonded ligands. **ACS Nano**, 2023, **17**, 2792.
 5. Y. Shi, L. Chen, **H. Zhang**, G. Nie, Z. Zhang*, M. Zhu*. The Potential of Nano-Enabled Oral Ecosystem Surveillance for Respiratory Disease Management. **Nano Today** 2023, **48**, 101693.
 6. S. Lu*, Z. Fu*, F. Li, K. Weng, L. Zhou, L. Zhang, Y. Yang, H. Qiu, D. Liu, W. Qing, H. Ding, X. Sheng, M. Chen, X. Tang, L. Duan, W. Liu, L. Wu, Y. Yang, **H. Zhang***, J. Li, Beyond a Linker: The Role of Photochemistry of Crosslinkers in the Direct Optical Patterning of Colloidal Nanocrystals. **Angew. Chem. Int. Ed.** 2022, **61**, e202202633.
 7. D. Liu*, K. Weng*, S. Lu, F. Li, H. Abudukeremu, L. Zhang, Y. Yang, J. Hou, H. Qiu, Z. Fu, X. Luo, L. Duan, Y. Zhang*, **H. Zhang***, J. Li, Direct Optical Patterning of Perovskite Nanocrystals with Ligand Crosslinkers. **Sci. Adv.** 2022, **8**, eabm8433.
 8. F. Li*, C. Chen*, S. Lu, X. Chen, W. Liu, K. Weng, Z. Fu, D. Liu, L. Zhang, H. Abudukeremu, L. Lin, Y. Wang, M. Zhong*, **H. Zhang***, J. Li. Direct Patterning of Colloidal Nanocrystals via Thermally Activated Ligand Chemistry. **ACS Nano** 2022, **16**, 13674.
 9. S.-F. Liu, Z.-W. Hou, L. Lin*, F. Li, Y. Zhao, X.-Z. Li, **H. Zhang**, H.-H. Fang, Z. Li, H.-B. Sun*. **Science** 2022, **377**, 1112.
 10. **H. Zhang***, H. Zhao*, X. Zhao, C. Xu, D. Franklin, A. Vazquez-Guardado, W. Bai, J. Zhao, K. Li, G. Monti, W. Lu, A. Kobeissi, L. Tian, X. Ning, X. Yu, S. Mehta, D. Chanda, Y. Huang, S. Xu*, B.E. Perez White*, J.A. Rogers*, Biocompatible Light Guide-Assisted Wearable Devices for Enhanced UV Light Delivery in Deep Skin. **Adv. Funct. Mater.** 2021, **31**, 2100576.
 11. W. Lu*, W. Bai*, **H. Zhang***, C. Xu, A.M. Chiarelli, A. Vazquez-Guardado, Z. Xie, H. Shen, K. Nandoliya, H. Zhao, K.H. Lee, Y. Wu, D. Franklin, R. Avila, S. Xu, A. Rwei, M. Han, K. Kwon, Y. Deng, X. Yu, H. Chiakamarri, E.B. Thorp, Y. Huang, J. Forbess, Z.-D. Ge*, J.A. Rogers*, Wireless, Implantable Catheter-type Oximeter Designed for Cardiac Oxygen Saturation. **Sci. Adv.** 2021, **7**, abe0579.
 12. J.M. Kurley*, J.-A. Pan*, Y. Wang, **H. Zhang**, J.C. Russel, G.F. Pach, B. To, J.M. Luther, D.V. Talapin*, Roll-To-Roll Friendly Solution-Processing of Ultrathin, Sintered CdTe Nanocrystal Photovoltaics. **ACS Appl. Mater. Interfaces** 2021, **13**, 44165.
 13. **H. Zhang***, P. Gutruf*, K. Meacham, M.C. Montana, X. Zhao, A.M. Chiarelli, A. Vázquez-Guardado, A. Norris, L. Lu, Q. Guo, C. Xu, Y. Wu, H. Zhao, X. Ning, W. Bai, I. Kandela, C.R. Haney, D. Chanda, R.W. Gereau IV, J.A. Rogers*. Wireless, Battery-Free Optoelectronic Systems as Subdermal Implants for Local Tissue Oximetry. **Sci. Adv.** 2019, **5**, eaaw0873.
 14. **H. Zhang**, J.A. Rogers*. Recent Advances in Flexible Inorganic Light Emitting Diodes: From Materials Design to Integrated Optoelectronic Platforms. **Adv. Optical Mater.** 2019, **7**, 1800936.
 15. W. Bai*, J. Shin*, R. Fu*, I. Kandela, D. Lu, X. Ni, Y. Park, Z. Liu, T. Hang, D. Wu, Y. Liu, C.R. Haney, I. Stepien, Q. Yang, J. Zhao, K.R. Nandoliya, **H. Zhang**, X. Sheng, L. Yin, K. MacRenaris, A. Brikha, F. Aird, M. Pezhouh, J. Hornick, W. Zhou, J.A. Rogers*. Bioresorbable photonic devices for the spectroscopic characterization of physiological status and neural activity. **Nat. Biomed. Eng.** 2019, **3**, 644.
 16. V. Kamysbayev*, V. Srivastava*, N.B. Ludwig*, O.J. Borkiewicz, **H. Zhang**, J. Ilavsky, B. Lee, K.W. Chapman, S. Vaikuntanathan, D.V. Talapin*. Nanocrystals in Molten Salts and Ionic Liquids: Experimental Observation of Ionic Correlations Extending beyond the Debye Length. **ACS Nano** 2019, **13**, 5760.

17. Q. Guo, J. Koo, Z. Xie, R. Avila, X. Yu, X. Ning, **H. Zhang**, X. Liang, S.B. Kim, Y. Yan, M.R. MacEwan, H.M. Lee, A. Song, Z. Di, Y. Huang, Y. Mei, J. Rogers*. A Bioresorbable Magnetically Coupled System for Low-Frequency Wireless Power Transfer. **Adv. Funct. Mater.** 2019, 1905451.
18. L. Lu[†], P. Gutruf[†], L. Xia[†], D.L. Bhatti[†], X. Wang, A. Vázquez-Guardado, X. Ning, X. Shen, T. Sang, R. Ma, G. Pakeltis, G. Sobczak, **H. Zhang**, D.-O. Seo, M. Xue, L. Yin, D. Chanda, X. Sheng, M.R. Bruchas*, J.A. Rogers*. Wireless optoelectronic photometers for monitoring neuronal dynamics in the deep brain. **Proc. Natl. Acad. Sci. U.S.A** 2018, 115, E1374.
19. **H. Zhang**, K. Dasbiswas, N.B. Ludwig, G. Han, B. Lee, S. Vaikuntanathan, D.V. Talapin*. Stable Colloids in Molten Inorganic Salts. **Nature** 2017, 542, 328.
**Highlighted by *c&en news*, *Phys.org*, *Argonne National Lab Science Highlight*, *UChicago News*, and others.
20. **H. Zhang**, J.S. Son, D.S. Dolzhnikov, A.S. Filatov, A. Hazarika, M.H. Hudson, S. Chattopadhyay, C. Sun, D.V. Talapin*. Soluble Lead and Bismuth Chalcogenidometallates: Versatile Chemistry and All-Scale Solders for Semiconductors. **Chem. Mater.** 2017, 29, 6396.
21. Y. Wang, I. Fedin, **H. Zhang**, D.V. Talapin*, Direct Optical Lithography of Functional Inorganic Nanomaterials. **Science** 2017, 357, 385.
**Highlighted by *Science*, *c&en news*, *Phys.org*, *MaterialsToday*, and others.
22. **H. Zhang**[†], J.M. Kurley[†], J.C. Russell, J. Jang, D.V. Talapin*. Solution-Processed, Ultrathin Solar Cells from CdCl₃⁻-capped CdTe Nanocrystals: The Multiple Roles of CdCl₃⁻ Ligands. **J. Am. Chem. Soc.** 2016, 138, 7464.
23. D.S. Dolzhnikov, **H. Zhang**, J. Jang, J.S. Son, M.G. Panthani, S. Chattopadhyay, T. Shibata, D.V. Talapin*. Composition-Matched Molecular Solders for Semiconductors. **Science** 2015, 347, 425.
**Highlighted by *Phys.Org.*, *ScienceDaily*, *Nanotechweb.org*, as well as others.
24. A. Nag, **H. Zhang**, E. Janke, D.V. Talapin*. Inorganic Surface Ligands for Colloidal Nanomaterials. **Z. Phys. Chem.** 2015, 229, 85.
25. **H. Zhang**, D.V. Talapin*. Thermoelectric Tin Selenide: The Beauty of Simplicity. **Angew. Chem. Int. Ed.** 2014, 53, 9126.
26. **H. Zhang**, J. Jang, W. Liu, D.V. Talapin*. Colloidal Nanocrystals with Inorganic Halide, Pseudohalide, and Halometallate Ligands. **ACS Nano** 2014, 8, 7359.
27. J.S. Son, **H. Zhang**, J. Jang, B. Poudel, A. Waring, L. Nally, D.V. Talapin*. All-Inorganic Nanocrystals as a Glue for BiSbTe Grains: Design of Interfaces in Mesostructured Thermoelectric Materials. **Angew. Chem. Int. Ed.** 2014, 53, 7466.
28. **H. Zhang**, J.S. Son, J. Jang, J.-S. Lee, W.-L. Ong, J.A. Malen, D.V. Talapin*. Bi_{1-x}Sb_x Alloy Nanocrystals: Colloidal Synthesis, Charge Transport, and Thermoelectric Properties. **ACS Nano** 2013, 7, 10296.
29. D. Chen, **H. Zhang**, Y. Liu, J. Li*. Graphene and Its Derivatives for the Development of Solar Cells, Photoelectrochemical, and Photocatalytic Applications. **Energy Environ. Sci.** 2013, 6, 1362.
30. Z. Wen, W. Wu, Z. Liu, **H. Zhang**, J. Li*, J. Chen*. Ultrahigh-Efficiency Photocatalysts Based on Mesoporous Pt-WO₃ Nanohybrids. **Phys. Chem. Chem. Phys.** 2013, 15, 6773.
31. X. Lv, W. Fu, H. Chang, **H. Zhang**, J. Cheng, G. Zhang, Y. Song, C. Hu, J. Li*. Hydrogen Evolution from Water Using Semiconductor Nanoparticle/Graphene Composite Photocatalysts without Noble Metals. **J. Mater. Chem.** 2012, 22, 1539.
32. X. Lv*, **H. Zhang**, H. Chang. Improved Photocatalytic Activity of Highly Ordered TiO₂ Nanowire Arrays for Methylene Blue Degradation. **Mater. Chem. Phys.** 2012, 136, 789.
33. H. Wang, Y. Bai, Q. Wu, W. Zhou, **H. Zhang**, J. Li*, L. Guo*. Rutile TiO₂ Nano-Branched Arrays on FTO for Dye-sensitized Solar Cells. **Phys. Chem. Chem. Phys.** 2011, 13, 7008.
34. H. Chang, Y. Liu, **H. Zhang**, J. Li*. Pyrenebutyrate-Functionalized Graphene/poly(3-octyl-thiophene) Nanocomposites Based Photoelectrochemical Cells. **J. Electroanal. Chem.** 2011, 656, 269.
35. X. Lv, H. Chang, **H. Zhang**, J. Li*. Photoelectrochemical Switch Based on Cis-Azobenzene Chromophore Modified TiO₂ Nanowires. **Opt. Commun.** 2011, 284, 4991.
36. **H. Zhang**, X. Lv, Y. Li, Y. Wang, J. Li*. P25-Graphene Composite as a High Performance Photocatalyst. **ACS Nano** 2010, 4, 380.

****TOP 20 most accessible articles in ACS Nano, 2010**

37. **H. Zhang**, D. Chen, X. Lv, Y. Wang, H. Chang, J. Li*. Energy Efficient Photodegradation of Azo Dyes with TiO₂ Nanoparticles Based on Photoisomerization and Alternate UV-Visible Light. **Environ. Sci. & Technol.** 2010, 44, 1107.
38. D. Chen, **H. Zhang**, X. Li, J. Li*. Biofunctional Titania Nanotubes for Visible-Light-Activated Photoelectrochemical Biosensing. **Anal. Chem.** 2010, 82, 2253.
39. L. Li, J. Huang, T. Wang, **H. Zhang**, Y. Liu, J. Li*. An Excellent Enzyme Biosensor Based on Sb-doped SnO₂ Nanowires. **Biosens. Bioelectron.** 2010, 25, 2436.
40. H. Wang, Y. Bai, **H. Zhang**, Z. Zhang, J. Li*, L. Guo*. CdS Quantum Dots Sensitized TiO₂ Nanorod Array on Transparent Conductive Glass Photoelectrodes. **J. Phys. Chem. C** 2010, 114, 16451.
41. H. Chang, X. Lv, **H. Zhang**, J. Li*. Quantum Dots Sensitized Graphene: In Situ Growth and Application in Photoelectrochemical Cells. **Electrochem. Commun.** 2010, 12, 483.
42. **H. Zhang**, G. Wang, D. Chen, X. Lv, J. Li*. Tuning Photoelectrochemical Performances of Ag-TiO₂ Nanocomposites via Reduction/Oxidation of Ag. **Chem. Mater.** 2008, 20, 6543.
43. D. Chen, G. Wang, **H. Zhang**, J. Li*. Synthesis of Nanocrystalline TiO₂ by a Salt-leaching Assisted Sol-gel Method and Their Photoelectrochemical Properties. **J. Nanosci. Nanotechnol.** 2009, 9, 2456.
44. D. Chen, **H. Zhang**, S. Hu, J. Li*. Preparation and Enhanced Photoelectrochemical Performance of Coupled Bicomponent ZnO-TiO₂ Nanocomposites. **J. Phys. Chem. C** 2008, 112, 117.
45. G. Wang, D. Chen, **H. Zhang**, J. Zhang, J. Li*. Tunable Photocurrent Spectrum in Well-Oriented Zinc Oxide Nanorod Arrays with Enhanced Photocatalytic Activity. **J. Phys. Chem. C** 2008, 112, 8850.
46. D. Chen, Y. Gao, G. Wang, **H. Zhang**, W. Lu, J. Li*. Surface Tailoring for Controlled Photoelectrochemical Properties: Effect of Patterned TiO₂ Microarrays. **J. Phys. Chem. C** 2007, 111, 13163.
47. D. Chen, Q. Zhang, G. Wang, **H. Zhang**, J. Li*. A Novel Composite Polymer Electrolyte Containing Room-Temperature Ionic Liquids and Heteropolyacids for Dye-Sensitized Solar Cells. **Electrochem. Commun.** 2007, 9, 2755.
48. D. Chen, G. Wang, W. Lu, **H. Zhang**, J. Li*. Photoelectrochemical Study on Organic-Inorganic Hybrid Thin Films via Electrostatic Layer-by-Layer Assembly. **Electrochem. Commun.** 2007, 9, 2151.

PATENTS APPLICATIONS

1. D.V. Talapin, Y. Wang, **H. Zhang**. Photoactive, Inorganic Ligand-Capped Inorganic Nanocrystals. **US Patent 11,720,017 B2** (08/08/2023)
2. D.V. Talapin, **H. Zhang**, V. Srivastava. Colloids of Inorganic Nanocrystals in Molten Media and Related Methods. **US Patent 11,040,323** (06/22/2021).
3. J.M. Kurley, **H. Zhang**, D.V. Talapin, J.C. Russell, M. Hudson. Hallometallate Ligand-Capped Semiconductor Nanocrystals. **US Patent 10,541,134** (01/21/2020).
4. D.S. Dolzhenkov, **H. Zhang**, J. Jang, J.S. Son, M.G. Panthani, D.V. Talapin. Compositionally Matched Molecular Solders for Semiconductors. **US Patent 10,283,357** (05/07/2019).

SERVICE AND TEACHING

Reviewer for *Chem. Sci.*, *Adv. Funct. Mater.*, *Chem. Commun.*, *Chem. Mater.*, *J. Phys. Chem. Lett.*, *ACS Appl. Mater. Interfaces*, *J. Mater. Chem. A*, *Nanoscale* and others.

Faculty mentor for Tsinghua Xuetang Special Pilot Class Lecture (Chemistry), Class 2018, 2022