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ACADEMIC APPOINTMENTS

Assistant Professor, Department of Chemistry, University of North Texas 2019 – Present
Physical Science Research Associate, Stanford Institute for Material and Energy Sciences 2017 – 2019

EDUCATION

Postdoctoral Researcher, Stanford University 2012 – 2016
Advisors: Nicholas A. Melosh, Zhi-Xun Shen
Postdoctoral Researcher, Harvard University 2010 – 2011
Advisor: Charles M. Lieber
Ph.D. in Chemistry, Harvard University 2003 – 2010
Advisor: Charles M. Lieber
Thesis: *Novel nanowire heterostructures for nanoelectronic applications*
B.S. in Chemistry, Peking University 1999 – 2003
Advisors: Jin Zhang
Thesis: *Carbon nanotubes: CVD growth and nanostructure formation*

PEER-REVIEWED PUBLICATIONS

*: Corresponding author

Publications from work performed at UNT

1. Wang, S., VanNatta, P. E., Wang, B., Liu, Z., Al-Enizi, A. M., Nafady, A., Ma, S.*, & Yan, H.* Pressure-Modulated Luminescence Enhancement and Quenching in a Hydrogen-Bonded Organic Framework. *Small*, 2411362 (2025). DOI: 10.1002/SMLL.202411362
2. VanNatta, P. E., Archambault, C. M., Wang, S., Lyu, T.; D'Amelio, J., Martell, N. J., Watson, S. K., Wang, K., Liu, Z., Kieber-Emmons, M. T., & Yan, H.* High Pressure-Derived Nonsymmetrical [Cu₂O]²⁺ Core for Room-Temperature Methane Hydroxylation. *Sci. Adv.* 10, eadq3366 (2024). DOI: 10.1126/SCIADV.ADQ3366
3. Seo, J., Ukani, R., Zheng, J., Braun, J. D., Wang, S., Chen, F. E., Kim, H. K., Zhang, S., Thai, C., McGillicuddy, R. D., Yan, H.*, Vlassak, J. J.*, & Mason, J. A.* Barocaloric Effects in Dialkylammonium Halide Salts. *J. Am. Chem. Soc.* 146, 2736–2747 (2024). DOI: 10.1021/jacs.3c12402
4. Lyu, T., Archambault, C. M., Hathaway, E., Zhu, X., King, C., Abu-Amara, L., Wang, S., Kunz, M., Kim, M. J., Cui, J., Yao, Y., Yu, T., Officer, T., Xu, M., Wang, Y., & Yan, H.* Self-Limiting Sub-5 nm Nanodiamonds by Geochemistry-Inspired Synthesis. *Small* 19, 2300659 (2023). DOI: 10.1002/SMLL.202300659
5. Lu, Z., Archambault, C. M., Li, S., Syed, U., Wang, S., Kumar, A., Shen, G., Liu, Z., Omary, M. A.*, & Yan, H.* Modulating the Extent of Anisotropic Cuprophilicity via High Pressure with Piezochromic

Luminescence Sensitization. *J. Phys. Chem. Lett.* 14, 508–515 (2023). DOI: 10.1021/ACS.JPCLETT.2C03284

6. Perera, N. A. K. R., Shankar, S. K., Archambault, C. M., Nesterov, V. N., Marpu, S. B., Yan, H.*, Omary, M. A. A Novel ppb-Level Sensitive and Highly Selective Europium-Based Diketone Luminescent Sensor for the Quantitative Detection of Aluminum Ions in Water Samples. *Analytica* 4, 432–446 (2023). DOI: 10.3390/ANALYTICA4040031
7. Varghese, S., Wang, S., Neupane, B., Bhandari, B., Jiang, Y., Gonzalez Rodriguez, R., Krylyuk, S., Davydov, A. V., Yan, H., Wang, Y., Kaul, A. B., Cui, J., & Lin, Y. Quantum Emitters Induced by High Pressure and UV Laser Irradiation in Multilayer GaSe. *ACS Omega*, 10, 7466–7473 (2025). DOI: 10.1021/acsomega.5c00680
8. Guragain, M., Kafle, A., Adesope, Q., Kularathne, P. P., Gharaee, M., Sapkota, B., Yan, H., Kelber, J. A., Cundari, T. R., & D’Souza, F. Boosting the Electrocatalytic Dinitrogen Reduction Reaction with Selenium Vacancy in Transition Metal Dichalcogenides. *Energy Fuels*, 39, 3619–3625 (2025). DOI: 10.1021/acs.energyfuels.4c05837
9. Varghese, S., Hurley, N., Kamau, S., Jiang, Y., Rodriguez, R. G., Bhandari, B., Lyu, T., Yan, H., Wang, Y., Kaul, A. B., Cui, J., & Lin, Y. Thermal-Strain-Enabled Enhanced Emission from UV Laser-Induced Defect Levels near the Surface of Multilayer MoS₂. *ACS Appl. Opt. Mater.* 2, 1721–1729 (2024). DOI: 10.1021/acsaom.4c00276
10. Alnasser, K., Li, S., Sidhik, S., Kamau, S., Hou, J., Hurley, N., Alzaid, A., Wang, S., Yan, H., Deng, J., Omary, M. A., Mohite, A. D., Cui, J., Lin, Y. Fabrications of twisted moiré photonic crystal and random moiré photonic crystal and their potential applications in light extraction. *Nanotechnol.* 35, 025203 (2023). DOI: 10.1088/1361-6528/ad024a
11. Lyu T., Hu, L., Yu, T., Officer, T., Xu M., Wang, Y., Kim, M. J., & Yan, H.*. Scalable synthesis of monodisperse nanodiamond by the Fe₂C-Fe₂O₃ high-pressure-high-temperature redox chemistry. *In preparation.*
12. Abu-Amara, L., Kotha, N., Wang, S., Shen, G., Solis-Ibarra, D.* & Yan, H.* Pressure-modulated topochemical polymerization under two-dimensional confinement. *In preparation.*
13. Lyu, T., Lefton, J. B., Etter, M., Liu, W., Kwan, L. J., Lv, B., Yan, H.* & Runčevski, T.* Making Room for Reactivity in Topochemical Transformations under Pressure. *In preparation.*
14. Wang, S., Sapkota, B., Hajiseyedejavadi, S. A., Gosai, P., Lavu, V., Rustagi, A., Cisneros, A.* & Yan, H.* Mapping the high-pressure conformational transitions of phospholipid bilayers with Raman spectroscopy. *In preparation.*
15. Bibek, S., Wang, S., Hajiseyedejavadi, S. A., Gosai, P., Lavu, V., Rustagi, A., Haley, S., Cisneros, A., Lauren, W., & Yan, H.* Molecular perturbation of lipid bilayers as possible cause and remedy for high-pressure neurological syndrome. *In preparation.*
16. Zhou, L., Yahagh, A., Yang, C., & Yan, H.* Pressure-modulated competition between repulsion and attraction in Ni···H–C anagostic interactions. *In preparation.*

Publications from work prior to joining UNT

17. Yan, H., Yang, F., Pan, D., Lin, Y., Li, F. H., Hohman, J. N., Solis-Ibarra, D., Dahl, J. E. P., Carlson, R. M. K., Tkachenko, B. A., Fokin, A. A., Schreiner, R. R., Galli, G., Mao, W. L., Shen, Z.-X. & Melosh, N. A. Sterically controlled mechanochemistry under hydrostatic pressure. *Nature* 554, 505-510 (2018). DOI: 10.1038/nature25765
18. Yan, H., Hohman, J. N., Li, F. H., Jia, C., Solis-Ibarra, D., Wu, B., Dahl, J. E. P., Carlson, R. M. K., Tkachenko, B. A., Fokin, A. A., Schreiner, P. R., Vailionis, A., Kim, T. R., Devereaux, T. P., Shen, Z.-X. & Melosh, N. A. Hybrid metal–organic chalcogenide nanowires with electrically conductive inorganic core through diamondoid-directed assembly. *Nat. Mater.* 16, 349-355 (2017). DOI: 10.1038/nmat4823
19. Yan, H., Narashimha, K., Denlinger, J., Li, F. H., Mo, S.-K., Hohman, J. N., Dahl, J. E. P., Carlson, R. M. K., Tkachenko, B. A., Fokin, A. A., Schreiner, P. R., Hussain, Z., Shen, Z.-X. & Melosh, N. A.

- Monochromatic photocathodes from graphene-stabilized diamondoids. *Nano Lett.* 18, 1099-1103 (2018). DOI: 10.1021/acs.nanolett.7b04645
20. Yan, H., Choe, H. S., Nam, S., Hu, Y., Das, S., Klemic, J. F., Ellenbogen, J. C. & Lieber, C. M. Programmable nanowire circuits for nanoprocessors. *Nature* 470, 240–244 (2011). DOI: 10.1038/nature09749
 21. Yao, J., Yan, H., Das, S., Klemic, J. F., Ellenbogen, J. C. & Lieber, C. M. Nanowire nanocomputer as a finite-state machine. *Proc. Natl. Acad. Sci. U. S. A.* 111, 2431–2435 (2014). DOI: 10.1073/pnas.1323818111
 22. Yao, J., Yan, H. & Lieber, C. M. A nanoscale combing technique for the large-scale assembly of highly aligned nanowires. *Nat. Nanotechnol.* 8, 329–335 (2013). DOI: 10.1038/nnano.2013.55
 23. Xiao, Q., Burg, J. A., Zhou, Y., Yan, H., Wang, C., Ding, Y., Reed, E., Miller, R. D. & Dauskardt, R. H. Electrically conductive copper core–shell nanowires through benzenethiol-directed assembly. *Nano Lett.* 18, 4900-4907 (2018). DOI: 10.1021/acs.nanolett.8b01623
 24. Tang, S., Zhang, C., Wong, D., Pedramrazi, Z., Tsai, H.-Z., Jia, C., Moritz, B., Claassen, M., Ryu, H., Kahn, S., Jiang, J., Yan, H., Hashimoto, M., Lu, D., Moore, R. G., Hwang, C.-C., Hwang, C., Hussain, Z., Chen, Y., Ugeda, M. M., Liu, Z., Xie, X., Devereaux, T. P., Crommie, M. F., Mo, S.-K. & Shen, Z.-X. Quantum spin Hall state in monolayer 1T'-WTe₂. *Nat. Phys.* 13, 683–687 (2017). DOI: 10.1038/nphys4174
 25. Zhang, C., Liu, Z., Chen, Z., Xie, Y., He, R., Tang, S., He, J., Li, W., Jia, T., Rebec, S. N., Ma, E. Y., Yan, H., Hashimoto, M., Lu, D., Mo, S.-K., Hikita, Y., Moore, R. G., Hwang, H. Y., Lee, D. & Shen, Z. Ubiquitous strong electron-phonon coupling at the interface of FeSe/SrTiO₃. *Nat. Commun.* 8, 14468 (2017). DOI: 10.1038/ncomms14468
 26. Tzeng, Y.-K., Zhang, J. L., Lu, H., Ishiwata, H., Dahl, J., Carlson, R. M. K., Yan, H., Schreiner, P. R., Vuckovic, J., Shen, Z.-X., Melosh, N. & Chu, S. Vertical-substrate MPCVD epitaxial nanodiamond growth. *Nano Lett.* 17, 1489–1495 (2017). DOI: 10.1021/acs.nanolett.6b04543
 27. Yan, H. & Melosh, N. Nanoparticles make salty circuits. *Nat. Nanotechnol.* 11, 579–580 (2016). DOI: 10.1038/nnano.2016.46
 28. Liu, N., Kim, K., Hsu, P.-C., Sokolov, A. N., Yap, F. L., Yuan, H., Xie, Y., Yan, H., Cui, Y., Hwang, H. Y. & Bao, Z. Large-scale production of graphene nanoribbons from electrospun polymers. *J. Am. Chem. Soc.* 136, 17284-17291 (2014). DOI: 10.1021/ja509871n
 29. Higginbotham, A. P., Kuemmeth, F., Larsen, T. W., Fitzpatrick, M., Yao, J., Yan, H., Lieber, C. M. & Marcus, C. M. Antilocalization of Coulomb blockade in a Ge/Si nanowire. *Phys. Rev. Lett.* 112, (2014). DOI: 10.1103/PhysRevLett.112.216806
 30. Zhang, Y., Chang, T.-R., Zhou, B., Cui, Y.-T., Yan, H., Liu, Z., Schmitt, F., Lee, J., Moore, R., Chen, Y., Lin, H., Jeng, H.-T., Mo, S.-K., Hussain, Z., Bansil, A. & Shen, Z.-X. Direct observation of the transition from indirect to direct bandgap in atomically thin epitaxial MoSe₂. *Nat. Nanotechnol.* 9, 111–115 (2014). DOI: 10.1038/nnano.2013.277
 31. Higginbotham, A. P., Larsen, T. W., Yao, J., Yan, H., Lieber, C. M., Marcus, C. M. & Kuemmeth, F. Hole spin coherence in a Ge/Si heterostructure nanowire. *Nano Lett.* 14, 3582–3586 (2014). DOI: 10.1021/nl501242b
 32. Li, F. H., Fabbri, J. D., Yurchenko, R. I., Mileshekin, A. N., Hohman, J. N., Yan, H., Yuan, H., Tran, I. C., Willey, T. M., Bagge-Hansen, M., Dahl, J. E. P., Carlson, R. M. K., Fokin, A. A., Schreiner, P. R., Shen, Z.-X. & Melosh, N. A. Covalent attachment of diamondoid phosphonic acid dichlorides to tungsten oxide surfaces. *Langmuir* 29, 9790–9797 (2013). DOI: 10.1021/la401781e
 33. Hu, Y., Xiang, J., Liang, G., Yan, H. & Lieber, C. M. Sub-100 nanometer channel length Ge/Si nanowire transistors with potential for 2 THz switching speed. *Nano Lett.* 8, 925–930 (2008). DOI: 10.1021/nl073407b
 34. Javey, A., Nam, S., Friedman, R. S., Yan, H. & Lieber, C. M. Layer-by-layer assembly of nanowires for three-dimensional, multifunctional electronics. *Nano Lett.* 7, 773–777 (2007). DOI: 10.1021/nl063056l

35. Xiang, J., Lu, W., Hu, Y., Wu, Y., Yan, H. & Lieber, C. M. Ge/Si nanowire heterostructures as high-performance field-effect transistors. *Nature* 441, 489–493 (2006). DOI: 10.1038/nature04796
36. Li, Y., Xiang, J., Qian, F., Gradecak, S., Wu, Y., Yan, H., Blom, D. A. & Lieber, C. M. Dopant-free GaN/AlN/AlGaIn radial nanowire heterostructures as high electron mobility transistors. *Nano Lett.* 6, 1468–1473 (2006). DOI: 10.1021/nl060849z
37. Li, Q. W., Yan, H., Zhang, J. & Liu, Z. F. Effect of hydrocarbons precursors on the formation of carbon nanotubes in chemical vapor deposition. *Carbon* 42, 829–835 (2004). DOI: 10.1016/j.carbon.2004.01.070
38. Li, Q. W., Zhang, J., Yan, H., He, M. S. & Liu, Z. F. Thionine-mediated chemistry of carbon nanotubes. *Carbon* 42, 287–291 (2004). DOI: 10.1016/j.carbon.2003.10.030
39. Yan, H., Li, Q. W., Zhang, J. & Liu, Z. F. The effect of hydrogen on the formation of nitrogen-doped carbon nanotubes via catalytic pyrolysis of acetonitrile. *Chem. Phys. Lett.* 380, 347–351 (2003). DOI: 10.1016/j.cplett.2003.09.031
40. Li, Q. W., Yan, H., Zhang, J. & Liu, Z. F. ‘Pulsed’ CVD growth of single-walled carbon nanotubes. *Carbon* 41, 2876–2878 (2003). DOI: 10.1016/s0008-6223(03)00343-9
41. Li, Q. W., Yan, H., Ye, Y. C., Zhang, J. & Liu, Z. F. Defect location of individual single-walled carbon nanotubes with a thermal oxidation strategy. *J. Phys. Chem. B* 106, 11085–11088 (2002). DOI: 10.1021/jp026512c
42. Li, Q. W., Yan, H., Cheng, Y., Zhang, J. & Liu, Z. F. A scalable CVD synthesis of high-purity single-walled carbon nanotubes with porous MgO as support material. *J. Mater. Chem.* 12, 1179–1183 (2002). DOI: 10.1039/b109763f
43. Li, Q. W., Yan, H., Li, X. H., Zhang, J. & Liu, Z. F. High-density growth of single-wall carbon nanotubes on silicon by fabrication of nanosized catalyst thin films. *Chem. Mater.* 14, 4262–4266 (2002). DOI: 10.1021/cm020300a
44. Yan, H., Li, Q. W., Zhang, J. & Liu, Z. F. Possible tactics to improve the growth of single-walled carbon nanotubes by chemical vapor deposition. *Carbon* 40, 2693–2698 (2002). DOI: 10.1016/S0008-6223(02)00175-6

† All rankings are based on h5-index by Google Scholar.

PATENTS

Patent from work performed at UNT

1. Lyu, T., Yan, H. Synthesis of uniform diamond nanoparticles. U.S. Patent Application 23/159,337

Patents from work prior to joining UNT

2. Lieber, C. M., Wu, Y., Yan, H. Nanoscale Wire-Based Data Storage. US Patent 8,154,002
3. Lu, W., Xiang, J., Wu, Y., Timko, B. P., Yan, H., Lieber, C. M. Nanowire Heterostructures. US Patent 7,858,965

INVITED TALKS

1. Precision mechanochemistry under high pressure. Texas Materials Institute, University of Texas Austin. 2025.
2. High-pressure science of molecular and nanostructured systems. Department of Chemistry, Southern Methodist University. 2025.
3. High-pressure science of molecular and nanostructured systems. Department of Chemistry, Texas Woman’s University. 2025.
4. Quasi-static traversal of thermally activated reaction pathways by high-pressure mechanochemistry. Texas Computational Chemistry Symposium. 2025.

5. Compressive mechanochemistry of molecular compounds. CMCC Mechanochemistry Discussion Seminar. 2024.
6. High-pressure precision chemistry. Chinese American Chemical Society Seminar. 2024.
7. Mapping the structural diversity of copper oxygen centers with high-pressure precision mechanochemistry. American Chemical Society Spring Meeting. 2024.
8. Controlling diamond growth with nanometer precision. European Materials Research Society Spring Meeting. 2024.
9. High-pressure Chemistry and Nanoscience. DFW Young Investigator Symposium. 2023.
10. Engineering porous materials under high pressure. 1st Annual Texas Pore Engineering Conference. 2022.
11. High-pressure chemistry and nanoscience. Department of Chemistry, Wichita State University. 2022.
12. High-pressure chemistry and nanoscience. Samueli School of Engineering, University of California Irvine. 2022.
13. Forging and breaking chemical bonds with high-pressure mechanochemistry. Asian Conference on High Pressure Research (ACHPR-10). 2021.
14. Molecules under pressure. University of North Texas Physics Colloquium. 2020.
15. Looking beyond phase transitions: Controlling chemical bonds, disorders and defects with mechanical pressure. University of North Texas Materials Science and Engineering Seminar. 2020.
16. Computational chemistry under extreme mechanical conditions. University of North Texas Hackathon Symposium. 2019.

OTHER PRESENTATIONS

1. High-pressure chemistry at nanometer scale. American Chemical Society Spring Meeting. 2022 (contributed talk).
2. Controlling non-covalent interactions in the solid state by high-pressure mechanochemistry. American Chemical Society Spring Meeting. 2022 (contributed talk).
3. High-pressure science in molecular and nanoscale systems. Gordon Research at High Pressure Conference. 2022 (contributed poster).
4. Nonsymmetric dicopper oxyl center by high-pressure mechanochemistry. Gordon Inorganic Chemistry Conference. 2022 (contributed poster).
5. Mechanochemistry in the compressive regime. Gordon Multiscale Mechanochemistry and Mechanobiology Conference. 2022 (contributed poster).

EXTERNAL FUNDING

*: Lead / sole PI

1. Yan, H.* Catching the transient: Stabilization and characterization of reaction intermediates in the $[\text{Cu}_2\text{O}_2]^{2+}$ system by high-pressure mechanochemistry. Welch Foundation. 2025 – 2028.
Total award: \$300,000. UNT portion: \$300,000. Role: Sole PI. Credited percentage: 100%.
2. Yan, H.*, Jia, C. High-pressure-high-temperature Formation of Higher Diamondoids. American Chemical Society Petroleum Research Fund. 2025 – 2027.
Total award: \$125,000. UNT portion: \$65,000. Role: Lead PI. Credited percentage: 100%.
3. Yan, H.* Recycling and reuse of epoxy molding compounds by deep eutectic solvent-assisted mechanochemistry. Semiconductor Research Corporation. 2025 – 2027.

Total award: \$315,000. UNT portion: \$315,000. Role: Sole PI. Credited percentage: 100%.

4. Yan, H.* Integrated Separation, Detection, and Mineralization of PFAS by Nanostructure-Augmented Reverse Osmosis. Semiconductor Research Corporation. 2025 – 2027.

Total award: \$315,000. UNT portion: \$315,000. Role: Sole PI. Credited percentage: 100%.

5. Yan, H.*, Chyan, O. M. Exploring Deep Eutectic Solvents as Environmentally Benign Post-etch Residue Removers. Semiconductor Research Corporation. 2024 – 2027.

Total award: \$315,000. UNT portion: \$315,000. Role: Lead PI. Credited percentage: 50%.

6. Webb, L., D’Arcy, S., Yan, H. Molecular Mechanisms of Life in the Deep Sea: Understanding Protein-Lipid Structures and Dynamics at High Pressure. Welch Foundation. 2024 – 2025.

Total award: \$100,000. UNT portion: \$40,000. Role: Co-PI. Credited percentage: 100%.

7. Cundari, T., Du, J., Yan, H. Acquisition of a High Performance Hybrid Computer Cluster for Computational Modeling. National Science Foundation. 2021 – 2024 (\$686,389, 3 years).

Total award: \$686,389. UNT portion: \$686,389. Role: Co-PI. Credited percentage: 10%.

INTERNAL FUNDING

1. Yan, H., Cisneros, A. Understanding the molecular foundation of deep-sea adaptation with synergistic experimental and computational methods. UNT Mentoring Microgrant. 2020 – 2021

Total award: \$5,000. Role: Co-PI. Credited percentage: 50%.

2. Yan, H., Jiang, Y. Multiscale structural design for lightweight energy absorbing materials via mechanochemistry and 3D printing. COS-CENG Seed Grant. 2021 – 2022

Total award: \$10,000. Role: Co-PI. Credited percentage: 50%.

TEACHING

1. CHEM 3510: Physical Chemistry I: Thermodynamics, University of North Texas 2021 – 2024

Total times taught: 4. Average department-specific SPOT: 3.9

Class size: 41 – 49

Materials covered: Laws of thermodynamics; Free energies; Phase transition; Chemical equilibrium; Theories of gases and solutions; Chemical kinetics.

2. CHEM 5210: Advanced Physical Chemistry, University of North Texas 2021 – 2024

Total times taught: 4. Average department-specific SPOT: 4.3

Class size: 2 – 9

Materials covered: Postulates of quantum mechanics; Schrodinger equation and solutions for model systems; Variation and perturbation theories; Theory of spin; Hartree-Fock and post-HF methods.

3. CHEM 3230: Physical Chemistry Lab I, University of North Texas 2019 – 2020

Total times taught: 2. Average department-specific SPOT: 3.8

Class size: 22 – 35

Materials covered: Physical measurement and error propagation; Physical and chemical measurements in gas, solution and multi-phase systems.

SERVICE

Services at UNT

1. Chair, Safety Committee, Department of Chemistry 2020 – Present
2. Co-chair, Safety Committee, Department of Chemistry 2019 – 2020
3. Member, Undergraduate Affairs Committee, Department of Chemistry 2021 – 2023
4. Member, Digital Public Relations Committee, Department of Chemistry 2022 – 2024
5. Member, Materials Research Facility Advisory Council 2020 – Present

External services

6. Peer reviewer for *Inorganic Chemistry*, *Nano Letters*, *Advance Materials*, *Nanoscale*, *IEEE Transactions on Electronic Devices*, and *Nature Communications* 2007 – Present
7. Panel reviewer for DOE SBIR 2022 – 2023
8. Panel reviewer for ACS Petroleum Research Fund 2023
9. Panel reviewer for Kansas NSF 2023
10. Outreach research advisor for Plano High School (Plano, TX), Memorial High School (Houston, TX), and Jasper High School (Plano, TX) 2019 – Present

AWARDS

- Frontier of Molecular Engineering Poster Prize, Chicago 2018
- ACS Certificate of Appreciation for “*valuable contribution and dedicated service in the peer review of manuscripts submitted to ACS journals*” 2011