Haitao Liu

Department of Chemistry
University of Pittsburgh
201 Eberly Hall
Pittsburgh, PA, 15260

Phone: (412)624-2062
Fax: (412)624-8611
E-mail: hliu@pitt.edu
http://www.pitt.edu/~liugroup

ACADEMIC APPOINTMENTS

2020-	Professor of Chemistry, University of Pittsburgh – Pittsburgh, PA
2023-2026	Chair, Department of Chemistry
2021-2023	Director of Graduate Studies, Department of Chemistry
2016-2020	Associate Professor, University of Pittsburgh – Pittsburgh, PA
2010-2016	Assistant Professor, University of Pittsburgh – Pittsburgh, PA
2017-2021	Guest Professor, Shanxi University, Taiyuan, China
2019-2020	Guest Professor, Shanghai Institute of Technology, Shanghai, China

EDUCATION

2007-2010	Postdoctoral Researcher, Columbia University – New York, NY
2002-2007	Ph.D. Chemistry, University of California, Berkeley – Berkeley, CA
1996-2001	B.S. Chemistry and Computer Science, USTC – Hefei, China

HONORS

2019	Early-Career Award in Experimental Physical Chemistry, American Chemical Society
2017	Chancellor's Distinguished Research Award, University of Pittsburgh
2013	Air Force Office of Scientific Research Young Investigator Award, AFOSR
2013	Young Investigator Award, E-MRS 2013 Spring Meeting, Symposium Q
2011	Faculty Summer Research Fellowship, AFOSR
2010	The Blavatnik Awards for Young Scientists, the New York Academy of Sciences
2009	The R&D 100 Award, the R&D Magazine

PROFESSIONAL SERVICES

Associate Editor: *IET Nanobiotechnology* (2018-), *Frontiers in Nanotechnology (2021-), IEEE-NANO 2017, 2019, 2023, IEEE-NMDC 2023*; Editorial board member: *Scientific Reports*; Guest Editor: *Chemistry of Materials*, special issue on *Synthetic and Mechanistic Advances in Nanocrystal Growth*. 2013.

Symposium Organizer: *2014 ACS National Meeting*: the chemistry of inorganic nanocrystals and clusters: structural characterization and mechanisms of growth; *2014 ACS CERM Meeting*: symposium on "Nucleic acid materials"; *2015 Spring MRS Meeting* Symposium N "From molecules to colloidal compound semiconductor nanocrystals: advances in mechanism-enabled design and syntheses"; *2015 ICMCTF conference*: 2D materials; 2016, 2017 *ICMCTF conferences*: Layered

materials: synthesis, characterization and tribological applications. *2021 Spring MRS Meeting* "Next-Generation Antimicrobial Materials—Combating Multidrug Resistance and Biofilm Formation"

Grant Review: AFOSR, NSF, DOE, PRF, ONR, Grants Council of Hong Kong, National Science Centre of Poland, National Center of Science and Technology Evaluation of Kazakhstan, Kuwait Foundation for the Advancement of Sciences

Peer Review: More than 30 journals including *Science, Nature Mater., Nature Chem., Nature Protocol, Nature Review Chem., Nature Comm., J. Am. Chem. Soc.*, *Nano. Lett.*, *Acc. Chem. Res., Chem. Mater.*, *ACS Nano*, *Chemical Science*, *Adv. Mater., Adv. Func. Mater., Angew. Chem. Int. Ed.*

PEER REVIEWED PUBLICATIONS

*: corresponding author, _: undergraduate student, total citations: > 8400; H-index: 40.

88. Bai, R.; Tolman, N.; Peng, Z.; **Liu, H.*** "Influence of Atmospheric Contaminants on the Work Function of Graphite" *Langmuir*, **2023**, *39*, 12159-12165

87. Mao, D.; Liu, L.; Zhang, C.; **Liu, H.**; Mao, C.* "Molecular Lithography on Silicon Wafers Guided by Porous, Extended Arrays of Small DNA Tiles" *Langmuir,* **2023***, 39,* 11782-11787

86. Stando, G.; Stando, P.; Sahlman, M.; Lundström, M.; **Liu, H.**; Dawid J.* "Synthesis of Nanocomposites via Electropolymerization of Aniline onto Hydrophilic Films from Nanocarbon and Investigation of Their Properties" *Electrochimica Acta,* **2023***, 463*, 142842

85. Tolman, N.; Bai, R.; **Liu, H.*** "Hydrocarbons in the Meniscus: Effects on Conductive Atomic Force Microscopy" *Langmuir*, **2023**, *39*, 4274-4281.

84. Yang, F.; Stando, G.; Thompson, A.; Gundurao, D.; Li, L.*; **Liu, H.*** "The Effect of Environmental Contaminants on the Interfacial Properties of 2D Materials". *Acc. Mater. Res.* **2022**, *3*, 1022-1032.

83. Chen, F.; Kim, M. A.; **Liu, H.***; Wolf, L. M.*; Yan M.* "Using Metal as the Substrate to Enhance the Reactivity of Graphene towards Diels-Alder Reactions" *Phys. Chem. Chem. Phys.* **2022**, *24* 20082-20093.

82. Kim, M. A.; Sorescu, D. C.; Amemiya, S.; Jordan, K. D.*; **Liu, H.*** "Real-Time Modulation of Hydrogen Evolution Activity of Graphene Electrodes Using Mechanical Strain" *ACS Appl. Mater. Interfaces* **2022**, *14*, 10691-10700

81. Hui, L.; Chen, C.; Kim, M. A.; **Liu, H.*** "Fabrication of DNA-Templated Pt Nanostructures by Area-Selective Atomic Layer Deposition" *ACS Appl. Mater. Interfaces* **2022**, *14*, 16538-16545

80. Hui, L.; Bai, R.; Liu, H.* "DNA-based nanofabrication for nanoelectronics" *Adv. Func. Mater.* **2022**, 2112331.

79. Salim, M.; Thimons, L. A.; Kim, M. A.; Carr, B.; Montgomery, M.; Tolman, N.; Jacobs, T. DB.* Liu, H.* "Single sheets of graphene for fabrication of fibers with enhanced mechanical properties" *Phys. Chem. Chem. Phys.* **2021**, *23*, 23124-23129

78. Yang, X.; Chen, F.; Kim, M. A.; **Liu, H.***; Wolf, L. M.; Yan, M. "On the Reactivity Enhancement of Graphene by Metallic Substrates towards Aryl Nitrene Cycloadditions" *Chem. Eur. J.* **2021**, *27*, 1-11

77. Hui, L.; Chen. J.; Kafley P.; **Liu, H**.* "Capture and Kill: Selective Eradication of Target Bacteria by a Flexible Bacteria-Imprinted Chip" *ACS Biomater. Sci. Eng.* **2021**, *7*, 90-95

76. Hui, L.; Nixon, R.; Tolman, N.; Mukai, J.; Bai, R.; Wang, R.; **Liu, H.*** "Area-Selective Atomic Layer Deposition of Metal Oxides on DNA Nanostructures and Its Applications" *ACS Nano* **2020**, 14, 13047-13055.

75. Bai, R.; Du, Y.; Xu, A.; Erikson, J. R.; Hui, L.; Chen, J.; Xiong, F.*; **Liu, H.***; "DNA-based Strategies for Site-specific Doping" *Adv. Func. Mater.* **2020**, 2005940

74. Zhou, F.; Sun, W.; Zhang, C.; Shen, J.; Yin, P.*; **Liu, H.*** "3D Freestanding DNA Nanostructure as a Low-Density High-Strength Material". *ACS Nano.* **2020**, *14*, 6582-6588

73. Kim, M.; Qiu, N.; Li, Z.; Huang, Q.; Chai, Z.; Du, S.*; **Liu, H.*** "Electric Field Effect on the Reactivity of Solid State Materials: The Case of Single Layer Graphene" *Adv. Func. Mater.* **2020**, *30*, 1909269.

72. Hui, L.; **Liu, H.*** "DNA-based Nanofabrication for Low-cost, High-resolution Patterning" *Proc. SPIE* **2019** DOI: 10.1117/12.2532934.

71. Hui, L.; Xu, A.; **Liu, H.*** "DNA-based Nanofabrication for Antifouling Applications" *Langmuir* **2019**, *35*, 12543-12549.

70. Hurst, J.; Kim, A.; Peng, Z.; Li, L.*; **Liu, H.*** "Assessing and Mitigating Airborne Hydrocarbon Contamination of Carbon Electrode Materials" *Chem. Mater.* **2019**, *31*, 7133-7142.

69. Salim, M.; Montgomery, M.; **Liu, H.*** "Airborne contamination of graphite as analyzed by ultra-violet photoelectron spectroscopy" *J. Elec. Spec. Rel. Phen.* **2019***, 235*, 8-15.

68. Tolman, N. L.; Mukai, J. M.; Wang, S.*; Zito, A.; Luo, T.; and **Liu, H.*** "The Effect of Physical Adsorption on the Capacitance of Activated Carbon Electrodes" *Carbon* **2019**, *150*, 334-339.

67. Hui, L.; Zhang, Q.; Deng, W.; **Liu, H.*** "DNA-Based Nanofabrication: Pathway to Applications in Surface Engineering" *Small* **2019**, *15*, 1805428.

66. Xiang, G.*; Tang, Y.; Liu, Z.*; Zhu, W.; **Liu, H.**, Wang, J.; Zhong, G.; Li, J.; Wang, X.* "Probing ligand-induced cooperative orbital redistribution that dominates nanoscale molecule-surface interactions with on-unit-thin TiO_2 nanosheets" *Nano Lett.* **2018**, *18*, 7809-7815.

65. Wang, R.; Zhang, G.*; **Liu, H.*** "DNA-based Nanofabrication" *Curr. Opin. Colloid Interface Sci.* **2018**, *38*, 88-99.

64. Ricardo, K. B.; **Liu, H.*** "Graphene-encapsulated DNA Nanostructure: Preservation of Topographic Features at High Temperature and Site-specific Oxidation of Graphene" *Langmuir* **2018**, *34*, 15045-15054.

63. Hurst, J.; Li, L.; **Liu, H.*** "Adventitious Hydrocarbons and the Graphite-water Interface" *Carbon* **2018**, *134*, 464.

62. Xu, A.; Harb, J. N., Kostiainen, M. A.; Hughes, M. L.; Woolley, A. T.; Liu, H.; Gopinath, A. "DNA origami: The bridge from bottom to top" *MRS Bull.* **2017**, 42, 943-950.

61. Weng, J.; Zhao, S.*, Li, Z.; Ricardo, K. B.; Zhou, F.; Kim, H.; **Liu, H.*** "Raman Enhancement and Photo-Bleaching of Organic Dyes in the Presence of Chemical Vapor Deposition-Grown Graphene" *Nanomaterials* **2017**, *7*, 337.

60. Kim, H.; Arbutina, K.; Xu, A.; **Liu, H.*** "Increasing the stability of DNA nanostructure templates by atomic layer deposition of Al_2O_3 and its application in imprinting lithography" *Beilstein J. Nanotechnol.* **2017**, *8*, 2363.

59. Gajurel, P.; Kim, M.; Wang, Q.; Dai, W.; **Liu, H**.; Cen, C.* "Vacancy-Controlled Contact Friction in Graphene" *Adv. Func. Mater.* **2017**, *27*, 1702832.

58. **Liu, H.*** "Nanofabrication Using Unmodified DNA Nanostructures" *IEEE-Nano* **2017**. DOI: 10.1109/NANO.2017.8117368.

57. Peng, Z.; Yang, R.; Kim, M. A.; Lei, L.*; **Liu, H.*** "Influence of O_2, H_2O and airborne hydrocarbons on the properties of selected 2D materials" *RSC Advances*. **2017**, *7*, 27048-27057

56. **Liu, H.***; Li, L.* "Graphitic Materials: Intrinsic Hydrophilicity and Its Implications" *Extreme Mech. Lett.* **2017**, *14*, 44-50.

55. Kozbial, A.; Trouba, C.; **Liu, H.**; Li, L.* "Characterization of the Intrinsic Water Wettability of Graphite Using Contact Angle Measurements: Effect of Defects on Static and Dynamic Contact Angles" *Langmuir* **2017**, *33*, 959-967

54. Ricardo, K. B.; Xu, A.; Salim, M.; Zhou, F.; **Liu, H.*** "Deposition of DNA Nanostructures on Highly Oriented Pyrolytic Graphite" *Langmuir* **2017**, *33*, 3991-3997

53. Tian, C.; Kim, H.; Sun, W.; Yin, P.; **Liu, H.*** "DNA Nanostructure-Mediated Molecular Imprinting Lithography" *ACS Nano* **2017**, *11*, 227-238.

52. Kozbial, A.; Zhou, F.; Li, Z.; **Liu, H.***; Li, L.* "Are Graphitic Surfaces Hydrophobic?" *Acc. Chem. Res.* **2016**, *49*, 2765-2773.

51. Parobek, D.; Shenoy, G. J.; Ward, M.*; **Liu, H.*** "Synthesizing and Characterizing Graphene via Raman Spectroscopy: An Upper-Level Undergraduate Experiment That Exposes Students to Raman Spectroscopy and a 2D Nanomaterial" *J. Chem. Edu.* **2016**, *93*, 1798-1803

50. Zhao, S.*; Zhou, F.; Li, Z.; **Liu, H.*** "Effect of precursor purity and flow rate on the CVD growth of hexagonal boron nitride" *J. Alloy. Compd.* **2016***, 688*, 1006-1012

50. Chen. R.; Balla, R. J.; Li, Z.; **Liu, H.**; Amemiya, S.* "Origin of Asymmetry of Paired Nanogap Voltammograms Based on Scanning Electrochemical Microscopy: Contamination Not Adsorption" *Anal. Chem.* **2016**, *88*, 8323-8331.

49. Liu, H.; Yang, X.; Ma, N.; **Liu, H.**; Xia, Y.; Chen, C.; Yang, D.*; Yao, X.* "Scalable and Cost-Effective Synthesis of Highly Efficient Fe2N-Based Oxygen Reduction Catalyst Derived from Seaweed Biomass" *Small* **2016**, *12*, 1295-1301.

48. Peng, Z.; **Liu, H.*** "Bottom-up Nanofabrication Using DNA Nanostructures" *Chem. Mater.* **2016**, *28*, 1012-1021.

47. Zhou, F.; Sun, W.; Ricardo, K. B.; Shen, J.; Yin, P.; **Liu, H.*** "Programmably-shaped Carbon Nanostructure from Shape-conserving Carbonization of DNA" *ACS Nano*, **2016**, *10*, 3069-3077.

46. Surwade, S. P.; Zhou, F.; Li, Z.; Powell, A.; O'Donnell, C.; **Liu, H.*** "Nanoscale Patterning of Self-assembled Monolayers using DNA Nanostructure Templates" *Chem. Comm.*, **2016**, *52*, 1677-1680.

45. Li, Z.; Kozbial, A.; Nioradze, N.; Parobek, D.; Shenoy, G. J.; Salim, M.; Amemiya, S., Li, L.*; **Liu, H.*** "Water protects graphitic surface from airborne hydrocarbon contamination" *ACS Nano,* **2016**, *10*, 349-359.

44. Shenoy, G. J.; Parobek, D.; Li, Z.; Tian, C.; **Liu, H.*** "Substrate Dependent Photochemical Oxidation of Monolayer Graphene" *RSC Adv.*, **2016***, 6,* 8489-8494.

43. Chen, R.; Nioradze, N.; Santhosh, P.; Li, Z.; Surwade, S. P.; Shenoy, G. J.; Parobek, D. G.; Kim, M. A.; **Liu, H.**; Amemiya, S.* "Ultrafast Electron Transfer Kinetics of Graphene Grown by Chemical Vapor Deposition" *Angew. Chem. Int. Ed.*, **2015**, *54*, 15134-15137.

42. Kozbial, A.; Gong, X.; **Liu, H.**; Li, L.* "Understanding the Intrinsic Water Wettability of Molybdenum Disulfide (MoS_2)." *Langmuir,* **2015**, *31*, 8429-8435.

41. Gao, T.; Li, Z.; Huang, P.; Shenoy, G.; Parobek, D.; Tan, S.; Lee, J.; **Liu, H.**; Leu, P.* "Hierarchical Graphene/Metal Grid Structures for Stable, Flexible Transparent Conductors" *ACS Nano* **2015**, *9*, 5440-5446.

40. Auletta, J. T.; LeDonne, G. J.; Gronborg, K. C.; Ladd, C. D.; **Liu, H.**; Clark, W. W.; Meyer, T. Y.* "Stimuli-Responsive Iron-Cross-Linked Hydrogels That Undergo Redox-Driven Switching between Hard and Soft States" *Macromolecules*, **2015**, *48*, 1736-1747.

39. Hui, L.; Auletta, J. T.; Huang Z.; Chen X.; Xia F.; Yang S.; **Liu H.**; Yang L.* "Surface Disinfection Enabled by a Layer-by-Layer Thin Film of Polyelectrolyte-Stabilized Reduced Graphene Oxide upon Solar Near-Infrared Irradiation" *ACS Appl. Mater. Inter.* **2015**, *7*, 10511-10517.

38. Parobek, D.; **Liu, H.*** "Wettability of graphene" *2D Mater.* **2015**, *2*, 032001

37. Zhou, F.; Michael, B. C.; Surwade, S.; Ricardo, K. B.; Zhao, S.; **Liu, H.*** "Mechanistic Study of the Nanoscale Negative-tone Pattern Transfer from DNA Nanostructures to SiO_2" *Chem. Mater.* **2015**, *27*, 1692-1698

36. Zhao, S.*; **Liu, H.*** "Bottom-up nanofabrication through catalyzed vapor phase HF etching of SiO_2" *Nanotechnology*. **2015**, *26,* 015301

35. Kim, H.; Surwade, S. P.; Powell, A.; O'Donnell, C.; **Liu, H.*** "Stability of DNA origami nanostructure under diverse chemical environments" *Chem. Mater.*, **2014**, *26*, 5265-5273

34. Novak, M.; Surwade, S. P.; Prokop, J.; Bolotin, K.; Hone, J.; Brus, L.; Nuckolls, C.*; **Liu, H.*** "Visualizing individual carbon nanotubes with optical microscopy". *J. Am. Chem. Soc.* **2014**, *136,* 8536-8539

33. Hui, L.; Piao, J.; Auletta J.; Hu, K.; Zhu, Y.; Meyer, T.; **Liu, H.***; Yang, L.* "Availability of the Basal planes of graphene oxide determines whether it is antibacterial" *ACS Appl. Mater. Interfaces.* **2014**, *6*, 13183-13190.

32. Kozbial, A.; Li, Z.; **Liu, H.***; Li, L.* "Study on the surface energy of graphene by contact angle measurement" *Langmuir,* **2014**, *30*, 8598-8606

31. Kozbial, A.; Li, Z.; **Liu, H.***; Li, L.* "Understanding the intrinsic water wettability of graphite" *Carbon* **2014**, *74*, 218-225.

30. Li, Z.; Zhou, F.; Parobek, D.; Shenoy, G. J.; Muldoon, P., **Liu, H.*** "Copper substrate as a catalyst for the oxidation of chemical vapor deposition-grown graphene" *J. Solid State Chem.* **2014**, 224, 14-20

29. Garcia-Rodriguez, R; **Liu, H.*** "Mechanistic insights into the role of alkylamine in the synthesis of CdSe nanocrystals" *J. Am. Chem. Soc.,* **2014**, *136,* 1968-1975

28. Garcia-Rodriguez, R; **Liu, H.*** "A nuclear magnetic resonance study of the binding of trimethylphosphine selenide to cadmium oleate" *J. Phys. Chem. A* **2014**, *118*, 7314-7319

27. Ricardo, K. B.; Sendecki, A.; **Liu, H.*** "Surfactant-free exfoliation of graphite in aqueous solutions" *Chem. Comm.* **2014**, *50*, 2751-2754

26. Xiang, G.-L.; Long, Y.; He, J.; Xu, B.; **Liu, H.***; Wang, X.* "Unusual Enrichment and Assembly of TiO_2 Nanocrystals at Water/Hydrophobic Interfaces in a Pure Inorganic Phase" *Langmuir,* **2014**, *30*, 617-623.

25. Garcia-Rodriguez, R; **Liu, H.*** "Solution structure of cadmium carboxylate and its implication to the synthesis of cadmium chalcogenide nanocrystals" *Chem Comm.*, **2013**, *49,* 7857-7859

24. Kozbial, A.; Li, Z.; Iasella, S.; Taylor, A. T.; Morganstein, B.; Wang, Y.; Sun, J.; Zhou, B.; Randall, N. X.; **Liu, H.***; Li L.* "Lubricating graphene with a nanometer-thick perfluoropolymer" *Thin Solid Films*, **2013**, *549*, 299-305.

23. Zhou, F.; Li, Z.; Shenoy, G. J.; Li, L.; **Liu, H.*** "Enhanced Room Temperature Corrosion of Copper in the Presence of Graphene" *ACS Nano*, **2013**, *7*, 6939-6947.

22. Li, Z.; Wang, Y.; Kozbial, A.; Shenoy, G.; Zhou, F.; McGinley, R.; Ireland, P.; Morganstein, B.; Kunkel, A.; Surwade, S. P. Li, L.* and **Liu, H.*** "Effect of airborne contaminants on the wettability of supported graphene and graphite" *Nature Mater.* **2013**, *12*, 925-931

21. Surwade, S. P.; Zhou, F.; Wei, B.; Sun, W.; Powell, A.; O'Donnell, C.; Yin, P.*; **Liu, H.***; "Nanoscale growth and patterning of inorganic oxides using DNA nanostructure templates" *J. Am. Chem. Soc.* **2013**, *135*, 6778-6781

20. García-Rodríguez, R.; Hendricks, M. P., Cossairt, B. M*; **Liu, H.***; Owen, J. S.* "Synthetic aspects of cadmium chalcogenide nanocrystal synthesis" *Chem. Mater*. **2013**, *25*, 1233 – 1249. Invited review

19. Zhang, G.; Surwade, S.; Zhou, F.; **Liu, H**.* "DNA nanostructure meets nanofabrication" *Chem. Soc. Rev.*, **2013**, *42*, 2488-2496. Invited review

18. Surwade, S. P.; Li, Z.; **Liu, H.*** "Thermal oxidation and unwrinkling of chemical vapor deposition-grown graphene" *J. Phys. Chem. C.* **2012***, 116,* 20600–20606.

17. Zhao, S.; Surwade, S. P; Li, Z.; **Liu, H.*** "Photochemical oxidation of CVD-grown single-layer graphene" *Nanotechnology* **2012**, *23*, 355703

16. García-Rodríguez, R.; **Liu, H.*** "Mechanistic Study of the Synthesis of CdSe Nanocrystals: Release of Selenium" *J. Am. Chem. Soc.* **2012**, *134*, 1400-1403

15. Surwade, S. P.; Zhao, S.; **Liu, H.*** "Molecular lithography through DNA-mediated etching and masking of SiO_2" *J. Am. Chem. Soc*. **2011**, *133*, 11868-11871

14. Ryu, S.; Liu, L.; Berciaud, S.; Yu, Y.-J.; **Liu, H.**; Kim, P.; Flynn, G.; Brus, L. "Atmospheric Oxygen Binding and Hole Doping in Deformed Graphene on a SiO_2 Substrate" *Nano Lett.* **2010**, *10*, 4944-4951

13. Owen, J. O.; Chan, E. M.; **Liu, H.**; Alivisatos, A. P. "Precursor Conversion Kinetics and the Nucleation of Cadmium Selenide Nanocrystals" *J. Am. Chem. Soc.* **2010**, *132*, 18206-18213

12. Wu, X.; Thrall, E.; **Liu, H**.; Steigerwald, M.; Brus, L. "Plasmon Induced Photovoltage and Charge Separation in Citrate-Stabilized Gold Nanoparticles" *J. Phys. Chem. C*, **2010**, *114*, 12896–12899

11. **Liu, H.**; Jin, H.; Tang, J.; Liu, H.; Pang, P.; Cao, D.; Lindsay, S.; Nuckolls, C. "Translocation of Single-Stranded DNA through Single-Walled Carbon Nanotubes" *Science,* **2010**, *327*, 64-67

10. **Liu, H.**; Ryu, S.; Chen, Z.; Steigerwald, M. L.; Nuckolls, C.; Brus, L. E. "Photochemical Reactivity of Graphene" *J. Am. Chem. Soc*., **2009**, *131*, 17099-17101

9. **Liu, H.**; Steigerwald, M. L.; Nuckolls, C. "Electrical Double Layer Catalyzed Wet-Etching of Silicon Dioxide" *J. Am. Chem. Soc.,* **2009**, *131*, 17034-17035**.**

8. **Liu, H.** "Tuning the Binding Energy of Surfactant to CdSe Nanocrystal: A Theoretical Study" *J. Phys. Chem. C* **2009**, *113*, 3116-3119

7. Cabot, A.; Smith, R.; Yin, Y.; Zheng, H.; Reinhard, B.; **Liu, H.**; Alivisatos, A. P. "Sulfidation of Cadmium at the Nanoscale" *ACS Nano* **2008**, *2*, 1452-1458.

6. Wu, X.; Redmond P. L.; **Liu, H.**; Chen, Y.; Steigerwald, M.; Brus, L. "Photovoltage Mechanism for Room Light Conversion of Citrate Stabilized Silver Nanocrystal Seeds to Large Nanoprisms" *J. Am. Chem. Soc.* **2008**, *130*, 9500-9505.

5. **Liu, H.**; Owen, J. S.; Alivisatos, A. P. "Mechanistic Study of Precursor Evolution in Colloidal Group II-VI Semiconductor Nanocrystal Synthesis" *J. Am. Chem. Soc.* **2007**, *129*, 305-312.

4. Ryan, K. M.; Mastroianni, A.; Stancil, K. A.; **Liu, H.**; Alivisatos, A. P. "Electric-Field-Assisted Assembly of Perpendicularly Oriented Nanorod Superlattices" *Nano Lett.* **2006**, *6*, 1479-1482.

3. Kanaras, A. G.; Sonnichsen, C.; **Liu, H.**; Alivisatos, A. P. "Controlled Synthesis of Hyperbranched Inorganic Nanocrystals with Rich Three-Dimensional Structures" *Nano Lett.* **2005**, *5*, 2164-2167

2. **Liu, H.**; Alivisatos, A. P. "Preparation of Asymmetric Nanostructures through Site Selective Modification of Tetrapods" *Nano Lett.* **2004**, *4*, 2397-240.

1. Wang, C. Y.; Mo, X.; Zhou, Y.; Zhu, Y. R.; **Liu, H.**; Chen, Z. Y. "A Convenient Ultraviolet Irradiation Technique for in situ Synthesis of CdS Nanocrystallites at Room Temperature" *J. Mater. Chem.* **2000**, *10*, 607-608

PATENT APPLICATIONS

5. Salim, M.; Liu, H.; Thimons L.; Kim, M.; Jacobs, T. "Carbon Fibers and Method of Fabrication Thereof" US Patent application 62/969,964

4. Liu, H.; Tian, C.; Kim, H. "DNA Nanostructure Patterned Templates" US patent application 15/993,579

3. Liu, H.; Zhou, F.; "Synthesis of Structured Carbon Material from Organic Materials" US Patent number: 10,450,652

2. Meyer, T. Y.; Clark, W. W.; Waldeck D.; Weiland, L. M.; Calvo-Marzal P.; Pan, T.; Harris, R. D.; Liu, H. "Redox stimulated variable-modulus material" US Patent number 9,944,729.

1. Gur, I.; Milliron, A. D.; Alivisatos, A. P.; Liu, H. "Methods of Making Functionalized Nanorods" United State Patent number: 8,093,494