



Education

- Jul. 1999, Ph.D. in Physical Chemistry, Institute of Photographic Chemistry, Chinese Academy of Sciences, Beijing, China. Supervisor: Prof. JianNian Yao.
- Jul. 1994, B.S. in Chemistry, Nankai University, Tianjin, China.

Professional Appointments

- Aug. 2010~, *Assistant Professor*, Colorado School of Mines, Golden, CO, USA.
- Jul. 2007~June 2010, *Research Project Scientist* with Prof. Reg M. Penner, University of California, Irvine, USA.
- Aug. 2004~Jul. 2007, *Postdoctoral Associate* with Prof. Y. Charles Cao, University of Florida, Gainesville, USA.
- Mar. 2002~Jul.2004, *Postdoctoral Associate* with Prof. Klaus Kern, Max-Planck-Institute for Solid State Research, Stuttgart, Germany.
- Nov. 1999~Feb.2002, *Alexander von Humboldt Fellowship Scholar* with Prof. Helmut Baumgärtel, Free University, Berlin, Germany.
- Sept. 1994~Jul.1999, *Research Assistant* with Prof. JianNian Yao, Institute of Photographic Chemistry, Chinese Academy of Sciences, Beijing, China.

Teaching Experience

- 2010~present, For undergraduate students: Principles of Chemistry (I) Lab (CHGN 121), Organic Chemistry Lab (CHGN 223C), Analytical Chemistry (CHGN 336), Summer Field Session (CHGN 490), and Senior Undergraduate Research (CHGN 495); For graduate students: Electrochemistry (CHGN 581).
- 2007~2010, Assisting in supervising two graduates on the research of thermoelectrics and lithium ion batteries.
- 2004~2007, Assisting in supervising four graduates on the research of colloidal quantum-dots.
- 2002~2004, Assisting in supervising one graduate on the research of supercapacitors.
- 1994~1999, Assisting in supervising one undergraduate on the research of photochromism.
- 1994~1999, TA for electrochemistry, physical chemistry and inorganic chemistry.

Professional Activities

- 2009~, Reviewer for J. Am. Chem. Soc., Angew. Chem. Int. Ed., Nano Lett., ACS Nano, Langmuir, Nanotechnology, Electrochimica Acta, Electrochem. Commun., J. Mater. Chem., J. Phys. D., Nanotechnology, J. Phys. D, J. Appl. Polymer Sci., MRS Proceedings, and J. Vac. Sci. & Tech.
- 2008~, Member of American Association for the Advancement of Science (AAAS).
- 2008~, Member of Material Research Society (MRS).
- 2005~, Member of American Chemical Society (ACS).
- 2000~, Member of Association of Alexander von Humboldt Fellowship Scholars.

Awards and Honors

- Mar. 2002~Jul. 2004, Max-Planck Postdoctoral Fellowship, Stuttgart, Germany.
- Nov. 1999~Feb. 2002, Alexander von Humboldt Research Fellowship, Berlin, Germany.

Funding

- Jan. 01 – Dec. 31, 2011, “Charging Lithium Ion Batteries with New Cathode Materials of Iron Oxyfluoride FeOF Nanostructures”, \$50k, **Seed Grant of REMSEC**.

- Jan. 01, 2011 – Dec. 31 2015, “Understanding and Improving the Energy Transfer Efficiency of Si Quantum Dots for Photovoltaics”, \$300k, **REMRSEC**.
- Sept. 01, 2011 – Aug. 31, 2012, “Earth-Abundant-Elements-Based Photovoltaic Materials: Synthesis and Characterization of Zinc-Alloyed Iron Pyrite $Zn_xFe_{1-x}S_2$ Colloidal Nanocrystal”, \$50k, **Seed Grant of REMSEC**.
- Jan. 01, 2013 – Aug. 31, 2015, “Improving the Cyclability of Iron Pyrite (p-FeS₂) Cathodes in Lithium Ion Batteries through Carbon Nanotube Encapsulation”, \$100k, **DNI of ACS-PRF** (PRF# 52877-DNI10).

Expertise and Research Interests

As a synthetic, inorganic, physical, and materials chemist, my research expertise and interests are focused on materials syntheses, properties assessments and applications development to improve the efficiency of sustainable energy conversion and storage, such as lithium ion batteries, photovoltaics, photoelectrochemical water splitting, supercapacitors, and thermoelectrics.

Peer-Reviewed Publications (*The underline highlights Yang’s corresponding authorship.*)

50. Chaukulkar, R.; de Peuter, K.; Stradins, P.; Pylypenko, S.; Bell, J.; **Yang, Y.**; Agarwal, S., Single-Step Plasma Synthesis of Carbon-Coated Silicon Nanoparticles. *ACS Applied Materials & Interfaces*, 2014, Accepted.
49. Bell, J. P.; Cloud, J. E.; Cheng, J.; Ngo, C.; Kodambaka, S.; Sellinger, A.; Williams, S. K. R.; **Yang, Y.** "*Bromosuccinimide-based Bromination and Subsequent Functionalization of Hydrogen-terminated Silicon Quantum Dots*", *RSC Advances*, **2014**, 4 (93), 51105-51110.
48. Yoder, T. S.; Cloud, J. E.; Leong, G. J.; Molk, D. F.; Tussing, M.; Miorelli, J.; Ngo, C.; Kodambaka, S.; Eberhart, M. E.; Richards, R. M.; **Yang, Y.** "*Colloidal Iron Pyrite Nanocrystal Inks: Solvothermal Synthesis, Digestive Ripening, and Reaction Mechanism*", *Chemistry of Materials*, **2014**, In revision.
47. Qu, J.; Cloud, J. E.; **Yang, Y.**; Ding, J.; Yuan, N. "*One-Step Synthesis of Nanoparticles-Deposited Double-Walled TiO₂-B Nanotubes with Enhanced Performance for Lithium-Ion Batteries*", *ACS Applied Materials & Interfaces*, **2014**, In revision.
46. Yoder, T. S.; Tussing, M.; Cloud, J. E.; **Yang, Y.** "*Resilient-Carbon Encapsulation toward Cyclable Iron Pyrite (FeS₂) Cathodes in Lithium Ion Batteries*", *Journal of Power Sources*, **2014**, Revision submitted.
45. Cloud, J. E.; Wang, Y.; Li, X.; Yang, Y.; **Yang, Y.** "*Lithium Silicide Nanocrystals: Synthesis, Chemical Stability, Thermal Stability, and Carbon Encapsulation*", *Inorganic Chemistry*, **2014**, DOI: [10.1021/ic501923s](https://doi.org/10.1021/ic501923s).
44. Cloud, J. E.; Wang, Y.; Yoder, T. S.; Taylor, L. W.; **Yang, Y.** "*Colloidal Nanocrystals of Lithiated Group 14 Elements*", *Angewandte Chemie International Edition*, **2014**, DOI: [10.1002/anie.201408108R1](https://doi.org/10.1002/anie.201408108R1).
43. Cheng, J.; Jimenez, C.; Bell, J. P.; Anderson, I. E.; Kendrick, C.; **Yang, Y.**; Collins, R. T.; Williams, S. K. R. "*Passivation, Separation and Characterization of Plasma Synthesized Silicon Nanoparticles*", *MRS Proceedings* **2013**, 1493, 117-119.
41. Cloud, J. E.; Taylor L. W., **Yang, Y.** “A simple and effective method for controllable synthesis of silver and silver oxide nanocrystals” *RSC Advances*, **2014**, 4(47), 24551 – 24559.
40. Qu, J.; **Yang, Y.**; Wu, Q. D.; Coxon, P. R.; Liu, Y. J.; He, X.; Xi, K.; Yuan, N. Y.; Ding, J. N. "*Hedgehog-like hierarchical ZnO needle-clusters with superior electron transfer kinetics for dye-sensitized solar cells*", *RSC Advances* **2014**, 4, 11430-11437.
39. McCann K.; Cloud, J. E.; **Yang, Y.** “Alternating voltage-induced electrochemical synthesis of colloidal Au nanicosahedra” *Journal of Nanoparticle Research* **2013**, 15, (11), 2065.
38. Cloud, J. E.; Yoder, T. S.; Harvey, N. K.; Snow, K.; **Yang, Y.** “A Simple and Generic Approach for Synthesizing Colloidal Metal and Metal Oxide Nanocrystals” *Nanoscale*,



- 2013, 5(16), 7368-7378
37. Cloud, J. E. ‡; McCann K. ‡; Perera K. A. P.; **Yang, Y.** “A Simple Method for Producing Colloidal Palladium Nanocrystals: Alternating Voltage Induced Electrochemical Synthesis”, *Small*, **2013**, 9(5), 2532–2536.
 36. Bittner, A. M.; Zhu, M.; **Yang, Y.**; Waibel, H. F.; Konuma, M.; Starke, U.; Weber, C. J. “Ageing of electrochemical double layer capacitors”, *Journal Power Sources*, **2012**, 203, 262-273.
 35. Chen, O.; **Yang, Y.**; Wang, T.; Wu, H.; Niu, C.; Yang, J.; Cao, Y. C. “Surface-functionalization-Dependent Optical Properties of II-VI Semiconductor nanocrystals”, *J. Am. Chem. Soc.*, **2011**, 133, 17504-17512.
 34. Yan, W.; Ayyazian, T.; Kim, J.; Liu, Y.; Donavan, K. C.; Xing, W.; **Yang, Y.**; Hemminger, J. C.; Penner, R. M. “Mesoporous Manganese Oxide Nanowires for High-Capacity, High-Rate, Hybrid Electrical Energy Storage”, *ACS Nano*, **2011**, 5, 8275-8287.
 33. Taggart, D. K.; **Yang, Y.**; Kung, S. C.; McIntire T. M.; Penner R. M. “Enhancement Thermoelectric Metrics in Ultra-long Electrodeposited PEDOT Nanowires”, *Nano Letters*, **2011**, 11, 125-131.
 32. **Yang, Y.**; Taggart D. K.; Cheng, M. H.; Hemminger, J. C.; Penner, R. M. "High-Throughput Measurement of the Seebeck Coefficient and the Electrical Conductivity of Lithographically Patterned Polycrystalline PbTe Nanowires", *J. Phys. Chem. Lett.*, **2010**, 1, 3004-3011.
 31. Chen, O.; Shelby, D.; **Yang, Y.**; Zhuang, J.; Omenetto, N.; Cao, Y. C. “Excitation-intensity-dependant, color-tunable, dual emissions from Mn-doped CdS/ZnS core/shell nanocrystals”, *Angew. Chem. Int. Ed.*, **2010**, 49, 10132-10135.
 30. **Yang, Y.**; Taggart, D. K.; Brown, M. A.; Xiang, C.; Kung, S.; Yang, F.; Hemminger, J. C.; Penner, R. M. “Wafer-scale patterning of lead telluride nanowires: structure, electrical properties, and reactivity in air”, *ACS Nano*, **2009**, 3, 4144-4154.
 29. Xiang, C. ^a; **Yang, Y.** ^a; Penner, R. M. “Cheating the diffraction limit: electrodeposited nanowires patterned by photolithography”, *Chem. Commun.*, **2009**, 859-873. (invited feature article, ^a: equal contribution).
 28. Chen, O.; Chen, X.; **Yang, Y.**; Lynch, J.; Wu, H.; Zhuang, J.; Cao, Y. C. “Synthesis of metal-selenide nanocrystals using SeO₂ as a precursor”, *Angew. Chem. Int. Ed.*, **2008**, 47, 8638-8641. (VIP).
 27. **Yang, Y.**; Chen, O.; Angerhofer, A.; Cao, Y. C. “Radial-position-controlled doping in CdS/ZnS core/shell nanocrystals: surface effects and position dependent properties”, *Chem. Eur. J.*, **2009**, 15, 3186-3197.
 26. **Yang, Y.**; Chen, O.; Angerhofer, A.; Cao, Y. C. “On doping CdS/ZnS core/shell nanocrystals with Mn”, *J. Am. Chem. Soc.*, **2008**, 130, 15649–15661.
 25. Zhu, M.; Weber, C. J.; **Yang, Y.**; Konuma, M.; Starke, U.; Kern, K.; Bittner, A. M. “Chemical and electrochemical ageing of carbon materials used in supercapacitor electrodes”, *Carbon*, **2008**, 46, 1829-1840.
 24. Xiang, C.; Kung, S. C.; Taggart, D. K.; Yang, F.; Thompson, M. A.; Güell, A. G.; **Yang, Y.**; Penner, R. M.; “Lithographically patterned nanowire electrodeposition: A method for patterning electrically continuous metal nanowires on dielectrics”, *ACS Nano*, **2008**, 2, 1939-1949. (cover)
 23. **Yang, Y.**; Kung, S.; Taggart, D. K.; Xiang, C.; Yang, F.; Brown, M. A.; Güell, A. G.; Kruse, T. J.; Hemminger, J. C.; Penner, R. M. “Synthesis of PbTe nanowire arrays using lithographically patterned nanowire electrodeposition”, *Nano Letters*, **2008**, 8, 2447-2451.
 22. Zhuang, J.; Wu, H. M.; **Yang, Y.**; Cao, Y. C. “Controlling colloidal superparticle growth through solvophobic interactions”, *Angew. Chem. Int. Ed.*, **2008**, 47, 2208-2212. (VIP)



21. **Yang, Y.**; Bittner, A. M.; Baldelli, S.; Kern, K. "Study of self-assembled triethoxysilane thin films made by casting neat reagents in ambient atmosphere", *Thin Solid Films*, **2008**, *516*, 3948-3956.
20. Zhuang, J.; Wu, H. M.; **Yang, Y.**; Cao, Y. C. "Supercrystalline colloidal particles from artificial atoms", *J. Am. Chem. Soc.*, **2007**, *129*, 14166-14167.
19. **Yang, Y.**; Bittner, A. M.; Kern, K. "A new SERS-active sandwich structure", *J. Solid State Electrochem.* **2007**, *11*, 150-154.
18. Wu, H; **Yang, Y.**; Cao, Y. C., "Synthesis of colloidal uranium-dioxide nanocrystals", *J. Am. Chem. Soc.*, **2006**, *128*, 16522-16523.
17. **Yang, Y.**; Chen, O.; Angerhofer A.; Cao, Y, C. "Radial-position-controlled doping in CdS/ZnS core/shell nanocrystals", *J. Am. Chem. Soc.*, **2006**, *128*, 12428-12429.
16. **Yang, Y.**; Wu, H. M.; Williams K. R.; Cao, Y. C. "Synthesis of high-quality CdSe and CdTe nanocrystals without precursor injection", *Angew. Chem. Int. Ed.*, **2005**, *44*, 6712-6716. (VIP)
15. **Yang, Y.**; Valet, O.; Donner, C.; Baumgärtel, H. "The adsorption of 2,3-dimercaptopropene sulfonate at the Au(111) electrode in alkaline solution", *Zeitschrift fuer Physicalische Chemie*, **2003**, *217*, 493-452.
14. Donner, C.; Valet, O.; **Yang, Y.**; Baumgärtel, H. "The chemisorption of 2,3-dimercapto-n-propane sulfonate at the Au(111)-electrode", *Zeitschrift fuer Physicalische Chemie*, **2003**, *217*, 1319-1330.
13. **Yang, Y.**; Ma, Y.; Loo, B. H.; Yao, J. N. "Simulation of sublimation process in preparation of photochromic WO₃ films by laser microprobe mass spectrometry", *J. Non-Cryst. Solids*, **2000**, *272*, 71-74.
12. **Yang, Y.**; Yao, J. N. "Microstructural study of WO₃ thin film during the electrochromic process using EXAFS", *J. Phys. Chem. Solids*, **2000**, *61*, 647-650.
11. Chen, Z. H.; **Yang, Y.**; Qiu, J. B.; Yao, J. N. "Fabrication of photochromic WO₃/4,4'-BAMBP superlattice films", *Langmuir*, **2000**, *16*, 722-725.
10. **Yang, Y.**; Wei, Y. B.; Loo, B. H.; Yao, J. N. "UV-light-induced electroless copper plating by means of ZnO film", *J. Electroanal. Chem.*, **1999**, *462*, 259-263.
9. Yao, J. N.; **Yang, Y.** "Photochromic enhancements of Au/MoO₃ and Pt/MoO₃ thin films", *Progr. Nat. Sci.*, **1999**, *10*, 153-157.
8. **Yang, Y.**; Cao, Y. W.; Loo, B. H.; Yao, J. N. "Microstructures of electrochromic MoO₃ thin films colored by injection of different cations", *J. Phys. Chem., B*, **1998**, *102*, 9392-9396.
7. Yao, J. N.; **Yang, Y.**; Loo, B. H. "Enhancement of photochromism and electrochromism in MoO₃/Au and MoO₃/Pt thin films", *J. Phys. Chem. B*, **1998**, *102*, 1856-1860.
6. Ji, X.; **Yang, Y.**; Yao, J. N. "Photochromic behavior of spin coated MoO₃ thin films", *Photographic Science and Photochemistry*, **1998**, *16*, 353-358.
5. Guan, Z. S.; Yao, J. N.; **Yang, Y.**; Loo, B. H. "Electrochromism of annealed vacuum-evaporated V₂O₅ films", *J. Electroanal. Chem.*, **1998**, *443*, 175-179.
4. **Yang, Y.**; Cao, Y. W.; Chen, P.; Loo, B. H.; Yao, J. N. "Visible-light photochromism in the electrolytically pretreated WO₃ thin films", *J. Phys. Chem. Solids*, **1998**, *59*, 1667-1669.
3. Guan, Z. S.; **Yang, Y.**; Ma, Y.; Yao, J. N. " Raman study of the electrochromic V₂O₅ films", *Acta Physico-Chimica Sinica*, **1999**, *15*, 279-283.
2. Wang, J. T.; Yuan, Y. F.; Xu, Y. M.; **Yang, Y.**; Wang, Ye, S. M. "The relationship between the intramolecular hydrogen bond of acylthiourea and its N-aromatic substituents", *Chem. J. Chin. Univ.*, **1995**, *16*, 1233-1236.
1. Wang, J. T.; Xu, Y. M.; Yuan, Y. F.; Wang, B.; **Yang, Y.**; Ye, S. M. "Multicomponent redox systems consisting of N-ferrocenyl-N'-ferrocenyl(ethylferrocene) thiourea and its copper (II) complexes", *Chem. J. Chin. Univ.*, **1995**, *16*, 1415-1419.

Conferences

16. Yoder, T.; Cloud, J. E.; **Yang, Y.*** “Synthesis and characterization of iron oxyfluoride nanostructures for lithium ion batteries”, 242nd National Meeting of ACS, Denver, CO (Aug. 28 – Sept. 03, 2011).
15. Molk, D. F.; **Yang, Y.*** “Synthesis of $Zn_xFe_{1-x}S_2$ nanocrystals for multi-junction solar cells”, 242nd National Meeting of ACS, Denver, CO (Aug. 28 – Sept. 03, 2011).
14. McCann, K.; Cloud, J. E.; Snow, K.; **Yang, Y.*** “Facile one-step method for synthesizing colloidal gold nanocrystals”, 242nd National Meeting of ACS, Denver, CO (Aug. 28 – Sept. 03, 2011).
13. Yan, W.; **Yang, Y.**; Penner, R. M. “Ultra-long MnO₂ nanowires as cathode materials for lithium ion batteries”, 241st National Meeting of ACS, Anaheim, CA (Mar. 27 – 31, 2011).
12. Penner, R.; Taggart, D.; **Yang, Y.** " Electrodeposition of Functional, Thermoelectric Nanowires Composed of PbTe, Bi₂Te₃, and PEDOT ", 219th ECS Meeting in Montreal, Canada (May 1 - 6, 2011).
11. **Yang, Y.**; Taggart, D. K.; Brown, M. A.; Yang, F.; Xiang, C.; Kung, S.; Hemminger, J. C.; Penner, R. M. “Towards thermoelectrics of electrodeposited PbTe nanowires” *MRS Fall Meeting 2009, Nov. 30-Dec. 04, 2009*, Boston, MA, USA.
10. **Yang, Y.**; Taggart, D. K.; Brown, M. A.; Xiang, C.; Kung, S.; Yang, F.; Hemminger, J. C.; Penner, R. M. “Synthesis of PbTe nanowires and their thermoelectric properties” *AVS 56th Symposium and Exhibition*, Nov. 8-13, **2009**, San Jose, CA, USA.
9. **Yang, Y.**; Kung, S.; Taggart, D. K.; Xiang, C.; Yang, F.; Brown, M. A.; Hemminger, J. C.; Penner, R. M. “Synthesis of Bi₂Te₃ and PbTe nanowires and measurement of their thermoelectric properties” *ACS-Western Regional Meeting*, Sept. 23-27, **2008**, Las Vegas, NV, USA.
8. Zhuang, J., Wu, H.; **Yang Y.**; Cao, Y. C. “Supercrystalline colloidal particles from artificial atoms”, 235th ACS National Meeting, Apr. 6-10, **2008**, New Orleans, LA, USA.
7. **Yang, Y.**; Kung, S.; Taggart, D. K.; Xiang, C.; Yang, F.; Brown, M. A.; Güell, A. G.; Kruse, T. J.; Hemminger, J. C.; Penner, R. M. “Synthesis of PbTe nanowire arrays on solid substrates: addressable, programmable, and suspendable”, 2008 MRS Spring Meeting, Mar. 24-28, **2008**, San Francisco, CA, USA.
6. Xiang, C.; Yang, F.; Kung, S.; **Yang, Y.**; Taggart, D. K.; Kruse, T. J.; Thompson, M. A.; Penner, R. M. “Lithographically patterned nanowire electrodeposition”, 2008 MRS Spring Meeting, Mar. 24-28, **2008**, San Francisco, CA, USA.
5. Yang, F.; Xiang, C.; **Yang, Y.**; Taggart, D. K.; Penner, R. M. “Characterization of nanowires by SEM and TEM”, Microscopy Society of Southern California, Spring Meeting, Mar. **2008**, Irvine, CA, USA.
4. **Yang Y.**; Chen, O.; Angerhofer A.; Cao, Y, C. “Radial-position-controlled doping in CdS/ZnS core/shell nanocrystals”, 233rd ACS National Meeting, March **2007**, Chicago, IL, USA.
3. **Yang, Y.**; Bittner, A. M.; Baldelli, S.; Kern, K. “Self-assembled triethoxysilane thin films made by casting neat reagents”, 17th *European Colloidal and Interface Society Conference*, Sept. **2003**, Firenze, Italy.
2. **Yang, Y.**; Valet, O.; Donner, C.; Baumgärtel, H. “Adsorption and phase formation building of 2,3-Dimercaptopropansulfonate layer on Gold (111)”, Bunsen-Tagung, May **2001**, Stuttgart, Germany.
1. **Yang, Y.**; Yao, J. N.; “Study of Photochromism and electrochromism of transition metal oxide semiconductors”, 2nd Bilateral China-Japan Symposium on Intelligent Electrophotonic Materials and Molecular Electronics, Sept. **1997**, Lanzhou, China.

Patents

8. “Conductive Polymer Lithium Ion Battery Anode Material”, Yang, Y., *Provisional Patent (US)*, filed in 2013.
7. “Lithium Ion Battery Anode Material”, Yang, Y., *Provisional Patent (US)*, filed in 2013.
6. “High Performance Cathode Based on Iron Pyrite (p-FeS₂) Composite Nanostructures for Room Temperature Lithium Ion Batteries”, Yang, Y. and Tara, S. Y. *Provisional Patent (US)*, filed in 2013.
5. “A Simple Method for Synthesizing Colloidal Palladium Nanocrystals: Alternating Voltage Induced Electrochemical Synthesis (AVIES)”, Yang, Y.; Cloud, J. E.; and McCann, K. *Provisional Patent (US)*, filed in 2012.
4. “Excitation-intensity-dependant, color-tunable, dual emitting nanocrystals”, Chen, O.; Shelby, Daniel.; **Yang, Y.**; Zhuang, J.; Omenetto, N.; Cao, Y. C. *US Patent US 20100264334*.
3. “Supercrystalline colloidal particles and method of production”, Zhuang, J.; Wu, H. M.; **Yang, Y.**; Cao, Y. C. *US Patent US 20110150938*.
2. “A method of filling a component with an anhydrous material and a component made by the method”, Bittner, A. M.; Waible, H. F., Weber, C.; Zhu, M.; **Yang, Y.**; Kern, K., *Patent No. PCT/EP2006/012372*
1. “Light-induced metallization of insulators via ZnO thin film”, Yao, J. N.; **Yang, Y.** *Patent No. CN1192485A, 1999*.

Book Chapter

1. “Introduction of photonic- and electronic-functional materials of transitional metal oxide semiconductors”, Yao, J. N.; **Yang, Y.** in “Mechanism of photo-induced reactions and photonic-material science” (Chinese), Ed. M. G. Fan, *et al.*, Chinese Scientific Publisher, **2001**, Ch. 17.