

Benjamin J. Wiley

Assistant Professor
Department of Chemistry
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Education

Ph.D. Chemical Engineering, June 2007

University of Washington, Department of Chemical Engineering, Seattle, WA

B.S. Chemical Engineering, May 2003

University of Minnesota, Department of Chemical Engineering, Minneapolis, MN

Experience

Assistant Professor of Chemistry, Duke University 2009-present

Postdoctoral Research Fellow, Harvard University 2007-2009

Advisor: George M. Whitesides, Department of Chemistry and Chemical Biology

Graduate Research Fellow, University of Washington 2003-2007

Advisor: Younan Xia, Department of Chemistry

Undergraduate Research Assistant, University of Minnesota 2001-2003

Advisors: L. E. Scriven and David J. Norris,
Department of Chemical Engineering and Materials Science

Awards

Ralph E. Powe Junior Faculty Enhancement Award 2011

Ruth L. Kirschstein National Research Service Award for Individual

Postdoctoral Fellows, *NIH* 2008-2009

Colloid and Surface Science Division Poster Award, *ACS* 2006

Graduate Student Gold Award, *MRS* 2005

NSF-IGERT Graduate Fellowship, *University of Washington* 2004-2006

Runstad Fellowship, *University of Washington* 2003-2004

NSF-IGERT Early Bird Award in Nanotechnology, *University of Washington* 2003

Roon Award, *Federation of Societies for Coatings Technology* 2003

Iron Range Scholarship, *University of Minnesota* 1999

Conference/Workshop Oral Presentations (*indicates an invited talk)

Commercialization of Micro-Nano Systems Conference, Greensboro, NC August, 2011

-Micro-Nano Technologies for Specialized Applications

*18th American Conference on Crystal Growth and Epitaxy, Monterey, CA August, 2011

-Fundamentals of Crystal Growth Symposium

*International Conference on Materials for Advanced Technologies, Singapore June, 2011

-Young Scientists Workshop

Nanotech 2001, Boston, Ma - Novel Nanostructured Coatings June, 2011

*American Chemical Society Fall National Meeting, Boston, MA -Nanoscience symposium	Aug, 2010
Triangle Soft Matter Workshop	May, 2010
*International Conference on One-dimensional Nanomaterials, Atlanta, GA	Dec., 2009

Invited Departmental Seminars

Southeastern Louisiana University, Dept. of Chemistry and Physics	October, 2011
Hong Kong University, Dept. of Mechanical Engineering	July, 2011
University of North Carolina, Chapel Hill, Dept. of Chemistry	October, 2010
Colby College	October, 2010

Service to the Profession

Conferences: Session Chair for 2010 National ACS Meeting

Proposal Review For: NSF, NIH, DOE, NRAS

Journal Review For: Science, Nat. Nano., Angew. Chem., Nano Lett., JACS, Chem. Rev., Adv. Mater, J. Phys. Chem, ACS Nano, ACS Appl. Mater. Interfaces, ACS Catalysis, Langmuir, Small, Nanoscale, Chem. Comm. Chem. Mater., Mater Chem., Eur J. Inorg. Chem., Nanoscale, Cryst. Growth Des., Int. J. Hyperthermia, Chem. Phys. Lett., Rapid Res. Lett., J. Exp. Nanosci.

Teaching

Modern Applications of Chemical Principles	2010-present
Materials Chemistry	2009-present

Publications

54. Bergin, S.M.; Rathmell, A.R.; Chen, Y.H; Charbonneau, P.; Li, Z.Y.; **Wiley, B.J.** The Effect of Nanowire Length and Diameter on the Properties of Transparent, Conducting Nanowire Films. *Nanoscale* **2012**, DOI: 10.1039/C2NR30126A.
53. Zhu, Y.; Qin, Q.; Xu, F.; Fan, F.; Ding Y.; Zhang, T.; **Wiley, B.J.**; Wang, Z.L. Size effects on elasticity, yielding, and fracture of silver nanowires: *In situ* experiments. *Phys. Rev. B* **2012**, 045443.
52. Yang, L.; Zhang, T.; Zhou, H.; Price, S.C.; **Wiley, B.J.**; You, W. Solution-Processed Flexible Polymer Solar Cells with Silver Nanowire Electrodes. *ACS Appl. Mater. Interfaces* **2011**, *3*, 4075-4084.
51. Rathmell, A.R., **Wiley, B.J.** The Synthesis and Coating of Long, Thin Copper Nanowires to make Flexible, Transparent Conducting Films on Plastic Substrates. *Adv. Mater.* **2011**, *23*, 4798-4803.
50. Xu, J.; Wilson, A.R.; Rathmell, A.R.; Howe, J.; Chi, M.; **Wiley, B.J.** Synthesis and Catalytic Properties of Au-Pd Nanoflowers. *ACS Nano* **2011**, *5*, 6119-6127.
49. Yang, Y.; Erb, R.M. **Wiley, B. J.**; Zauscher, S.; Yellen, B.B.; Imaginary Magnetic Tweezers for Massively Parallel Surface Adhesion Spectroscopy. *Nano Lett* **2011**, *11*, 1681-1684.
48. Xu, F.; Durham, III, J.W.; **Wiley, B.J.**; Zhu, Y. Strain-Release Assembly of Nanowires on Stretchable Substrates. *ACS Nano* **2011**, *5*, 1556-1563.
47. **Wiley, B. J.**; Qin, D.; Xia, Y. Nanofabrication at high throughput and low cost. *ACS Nano* **2010**, *4*, 3554-3559. (Invited Perspective).

46. Rathmell, A. R.; Roy, P. S.; Bergin, S. M.; Hua, Y.-L.; Li, Z.-Y.; **Wiley, B. J.** The Growth Mechanism of Copper Nanowires and their Properties in Flexible, Transparent Conducting Films. *Adv. Mater.* **2010**, *22*, 3558–3563.

Postdoctoral and Graduate Publications

45. Kubo, M.; Li, X.; Kim, C.; Hashimoto, M.; **Wiley, B. J.**; Ham, D.; Whitesides, G. M. Stretchable Microfluidic Radiofrequency Antennas. *Adv. Mater.* **2010**, *22*, 2749–2752.
44. Martinez, A. W.; Phillips, S. T.; Nie, Z. H.; Cheng, C. M.; Carrilho, E.; Wiley, B. J.; Whitesides, G. M., Programmable diagnostic devices made from paper and tape. *Lab Chip* **2010**, *10*, 2499-2504.
43. Guo, X.; Qiu, M.; Bao, J.; **Wiley, B. J.**; Yang, Q.; Zhang, X.; Ma, Y.; Yu, H.; Tong, L. Direct Coupling of Plasmonic and Photonic Nanowires for Hybrid Nanophotonic Components and Circuits. *Nano Lett.* **2009**, *9*, 4515-4519.
42. Lipomi, D. J.; Ilijevski, F.; **Wiley, B. J.**; Deotare, P.B.; Loncar, M.; Whitesides, G. M. Integrated Fabrication and Magnetic Positioning of Metallic and Polymeric Nanowires Embedded in Thin Epoxy Slabs. *ACS Nano* **2009**, *3*, 3315–3325.
41. Siegel, A. C.; Phillips, S. T.; **Wiley, B. J.**; Whitesides, G. M. Thin, Lightweight, Foldable Thermochromic Displays on Paper. *Lab Chip* **2009**, *9*, 2775-2781.
40. Stan, C. A.; Schneider, G. F.; Shevkoplyas, S. S.; Hashimoto, M.; Ibanescu, M.; **Wiley B. J.**; Whitesides, G. M. A Microfluidic Apparatus for the Study of Ice Nucleation in Supercooled Water Drops. *Lab Chip* **2009**, *9*, 2293-2305.
39. Jones, A. C.; Olmon, R. L.; Skrabalak, S. E.; **Wiley, B. J.**; Xia Y.; Raschke, M. B. Mid-IR Plasmonics: Near-Field Imaging of Coherent Plasmon Modes of Silver Nanowires. *Nano Lett.* **2009**, *9*, 2553-2558.
38. Moran, C. H.; Wainerdi, S. M.; Cherukuri, T. K.; Kittrell, C.; **Wiley, B. J.**; Nicholas, N. W.; Curley, S. A.; Kanzius, J. S.; Cherukuri, P. Size-Dependent Joule Heating of Gold Nanoparticles Using Capacitively Coupled Radiofrequency Fields. *Nano Res.* **2009**, *2*, 400-405.
37. Thomas, S. W.; Chiechi, R. C.; LaFratta, C. N.; Webb, M. R.; Lee, A.; **Wiley, B. J.**; Zakin, M. R.; Walt, D. R.; Whitesides, G. M. Infochemistry and Infofuses: Chemical Storage and Transfer of Coded Information. *PNAS* **2009**, *106*, 9147-9150.
36. Lu, X.; Rycenga, M.; Skrabalak, S. E.; **Wiley, B. J.** and Xia, Y. Chemical Synthesis of Novel Plasmonic Nanoparticles. *Annu. Rev. Phys. Chem.* **2009**, *60*, 167-192.
35. Martinez, A. W.; Phillips, S. T.; **Wiley, B. J.**; Gupta, M. and Whitesides, G. J. FLASH: A rapid method for prototyping paper-based microfluidic devices. *Lab Chip* **2008**, *8*, 2146-2150.
34. **Wiley, B. J.**; Lipomi, D. J.; Bao, J.; Capasso, F. and Whitesides, G. M. Fabrication of Surface Plasmon Resonators by Nanoskiving Single-Crystalline Gold Microplates. *Nano Lett.* **2008**, *8*, 3023-3028.
33. Pyayt, A. L.; **Wiley, B. J.**; Xia, Y.; Chen, A. and Dalton, L. Integration of Silver Nanowire Plasmonic and Photonic Waveguides. *Nat. Photonics* **2008**, *3*, 660-665.
32. Rang, M.; Jones, A. C.; Zhou, F.; Li, Z.-Y.; **Wiley, B. J.**; Xia, Y. and Raschke, M. B. Optical Near-Field Mapping of Plasmonic Nanoprisms. *Nano. Lett.* **2008**, *8*, 3357-3363.
31. Skrabalak, S. E.*; **Wiley, B. J.***; Kim, M. H.; Formo, E. and Xia, Y. On the Polyol Synthesis of Silver Nanostructures: Glycolaldehyde as a Reducing Agent. *Nano Lett.* **2008**, *8*, 2077-2081. *co-first author

30. Kim, M. H.; Lu, X.; **Wiley, B. J.**; Lee, E. P. and Xia, Y. The Morphological Evolution of Single-Crystal Ag Nanospheres During the Galvanic Replacement Reaction with H₂AuCl₄. *J. Phys. Chem. C* **2008**, *112*, 7872-7876.
29. Xiong, Y.; **Wiley, B. J.** and Xia, Y. Nanocrystals with Unconventional Shapes – A Class of Promising Catalysts. *Angew. Chem. Int. Ed.* **2007**, *46*, 7157-7159.
28. **Wiley, B. J.**; Sun, Y. and Xia, Y. Synthesis of Silver Nanostructures with Controlled Shapes and Properties. *Acc. Chem. Res.* **2007**, *40*, 1067-1076.
27. Chen, J.; **Wiley, B. J.** and Xia, Y. One-Dimensional Nanostructures of Metals: Large-Scale Synthesis and Some Potential Applications. *Langmuir* **2007**, *23*, 4120-4129. *cover article*
26. Xiong, Y.; Cai, H.; **Wiley, B. J.**; Wang, J.; Kim, M. J. and Xia, Y. Synthesis and Mechanistic Study of Palladium Nanobars and Nanorods. *J. Am. Chem. Soc.* **2007**, *129*, 3665-3675.
25. **Wiley, B. J.**; Chen, Y.; McLellan, J. M.; Xiong, Y.; Li, Z.-Y.; Ginger, D. and Xia, Y. Synthesis and Optical Properties of Silver Nanobars and Nanorice. *Nano Lett.* **2007**, *7*, 1032-1036.
24. Petrova, H.; Lin, C.-H.; de Liejer, S.; Hu, M.; McLellan, J. M.; Siekkinen, A. R.; **Wiley, B. J.**; Marquez, M.; Xia, Y.; Sader, J. E. and Hartland, G. V. Time-Resolved Spectroscopy of Silver Nanocubes: Observation and Assignment of Coherently Excited Vibrational Modes. *J. Chem. Phys.* **2007**, *126*, 094709.
23. Fu, E.; Ramsey, S. A.; Chen, J.; Chinowsky, T. M.; **Wiley, B. J.**; Xia, Y. and Yager, P. Resonance Wavelength-Dependent Signal of Absorptive Particles in Surface Plasmon Resonance-Based Detection. *Sens. Actuators, B* **2007**, *123*, 606-613.
22. Meng, L.; Hong, W.; Nagel, A.; **Wiley, B. J.**; Scriven, L. and Norris, D. The Role of Thickness Transitions in Convective Assembly. *Nano Lett.* **2006**, *6*, 2249-2253.
21. **Wiley, B. J.**; Wang, Z.; Wei, J.; Yin, Y.; Cobden, D. and Xia, Y. Synthesis and Electrical Characterization of Silver Nanobeams. *Nano Lett.* **2006**, *6*, 2273-2278.
20. Sanders, A.; Routenberg, D.; **Wiley, B. J.**; Xia, Y.; Dufresne, E. and Reed, M. Observation of Plasmon Propagation, Redirection, and Fan-Out in Silver Nanowires. *Nano Lett.* **2006**, *6*, 1822-1826.
19. **Wiley, B. J.**; Im, S.-H.; Li, Z.-Y.; McLellan, J.; Siekkinen, A. and Xia, Y. Maneuvering the Surface Plasmon Resonance of Silver Nanostructures through Shape-Controlled Synthesis. *J. Phys. Chem. B*, **2006**, *110*, 15666-15675. *cover article*
18. **Wiley, B. J.**; Xiong, Y.; Li, Z.-Y. and Xia, Y. Right Bipyramids of Silver: A New Shape Derived from Single Twinned Seeds. *Nano Lett.* **2006**, *6*, 765-768.
17. Zettsu, N.; McLellan, J. M.; **Wiley, B. J.**; Yin, Y.; Li, Z.-Y. and Xia, Y. Rhodium Multipods: Synthesis, Stability, Surface Plasmonic Properties, and Their Use as Substrates for Surface-Enhanced Raman Scattering. *Angew. Chem. Int. Ed.* **2006**, *45*, 1288-92.
16. Xiong, Y.; **Wiley, B. J.**; Chen, J.; Li, Z.-Y. and Xia, Y. Corrosion-Based Synthesis of Single-Crystal Pd Nanoboxes and Nanocages and their Surface Plasmon Properties. *Angew. Chem. Int. Ed.* **2005**, *44*, 7913-7917.
15. Chen, J.; **Wiley, B. J.**; McLellan, J.; Xiong, Y.; Li, Z.-Y. and Xia, Y. Optical Properties of Pd-Ag and Pt-Ag Nanoboxes Synthesized via Galvanic Replacement Reactions. *Nano Lett.* **2005**, *5*, 2058-2062.
14. Sherry, L.; Chang, S.; Schatz, G.; Van Duyne, R.; **Wiley, B. J.** and Xia, Y. Localized Surface Plasmon Resonance Spectroscopy of Single Silver Nanocubes. *Nano Lett.* **2005**, *5*, 2034-2038.

13. Wiley, B. J.; Sun, Y. and Xia, Y. Polyol Synthesis of Silver Nanostructures: Control of Product Morphology with Fe(II) or Fe(III) Species. *Langmuir* **2005**, *21*, 8077-8080.
12. Cang, H.; Sun, T.; Chen, J.; Wiley, B. J.; Li, Z.-Y.; Xia, Y. and Li, X. Gold Nanocages as Potential Contrast Agents for Spectroscopic and Conventional Optical Coherence Tomography. *Opt. Lett.* **2005**, *30*, 3048-3050.
11. Lee, Y.-T.; Im, S.-H.; Wiley, B. J. and Xia, Y. Quick Formation of Single-Crystal Nanocubes of Silver through Dual Functions of Hydrogen Gas in Polyol Synthesis. *Chem. Phys. Lett.* **2005**, *441*, 479-483.
10. Chen, J.; Wiley, B. J.; Li, Z.; Cang, H.; Campbell, D.; Saeki, F.; Au, L.; Lee, J.; Li, X. and Xia, Y. Gold Nanocages: Engineering the Structure for Biomedical Applications. *Adv. Mater.* **2005**, *17*, 2255-2261.
9. Xiong, Y.; Wiley, B. J.; Chen, J.; Xia, Y.; Yin, Y. and Li, Z.-Y. Size-Dependence of Surface Plasmon Resonance and Oxidation for Pd Nanocubes Synthesized via a Seed Etching Process. *Nano Lett.* **2005**, *5*, 1237-1242.
8. Wang, Y.; Lee, K.; Shang, H.; Wiley, B. J.; Xia, Y.; and Cao, G. Ag-Ag_{0.08}V₂O₅·nH₂O Composite Films as Host Materials for Li-ion Intercalation. *Phys. Stat. Sol. A* **2005**, *202A*, R79-R81.
7. Xiong, Y.; Chen, J.; Wiley, B. J.; Xia, Y.; Aloni, S.; and Yin, Y. Understanding the Role of Oxidative Etching in the Polyol Synthesis of Palladium Nanoparticles with Uniform Shape and Size. *J. Am. Chem. Soc.* **2005**, *127*, 7332-7333.
6. Wiley, B. J.; Sun, Y.; Chen, J.; Cang, H.; Li, Z.-Y.; Li, X. and Xia, Y. Silver and Gold Nanostructures with Well-Controlled Shapes. *MRS Bull.* **2005**, *30*, 356-361.
5. Chen, J.; Saeki, F.; Wiley, B. J.; Cang, H.; Cobb, M. J.; Li, Z.-Y.; Au, L.; Zhang, H.; Kimmey, M.; Li, X. and Xia, Y. Gold Nanocages: Bioconjugation and their Potential Use as Optical Imaging Contrast Agents. *Nano Lett.* **2005**, *5*, 473-477.
4. Im, S.-H.; Lee, Y. T.; Wiley, B. J. and Xia, Y. Large-Scale Synthesis of Silver Nanocubes: The Role of HCl in Promoting Cube Perfection and Monodispersity. *Angew. Chem. Int. Ed.* **2005**, *44*, 2154-2157.
3. Wiley, B. J.; Sun, Y.; Mayers, B. and Xia, Y. Shape-Controlled Synthesis of Metal Nanostructures: The Case of Silver. *Chem. Eur. J.* **2005**, *11*, 454-463. *cover article*
2. Wiley, B. J.; Herricks, T.; Sun, Y. and Xia, Y. Polyol Synthesis of Silver Nanoparticles: Use of Chloride and Oxygen to Promote the Formation of Single-Crystal, Truncated Cubes and Tetrahedrons. *Nano Lett.* **2004**, *4*, 1733-1739.
1. Sun, Y.; Wiley, B. J.; Li, Z.-Y. and Xia, Y. Synthesis and Optical Properties of Nanorattles and Multiple-Walled Nanoshells/Nanotubes Made of Metal Alloys. *J. Am. Chem. Soc.* **2004**, *126*, 9399-9406.