

Song Jin

Assistant Professor, Department of Chemistry, University of Wisconsin-Madison
1101 University Avenue, Madison, WI 53706

Phone: (608)262-1562, FAX: (608)262-0453, E-mail: jin@chem.wisc.edu

homepage: <http://www.chem.wisc.edu/people/profiles/Jin.php>

research group webpage: <http://jin.chem.wisc.edu/>

Academic Appointments:

8/04 to present Assistant Professor, Department of Chemistry, University of Wisconsin-Madison

1/05 to present Faculty member of Materials Science Program (MSP), UW-Madison

Education:

2002-2004 Postdoctoral Fellow Harvard University, Cambridge, MA. Advisor: Charles M. Lieber

2002 PhD in Chemistry Cornell University, Ithaca, NY. Advisor: Francis J. DiSalvo.

1997 B.S. in Chemistry Peking (Beijing) University, Beijing, China.

Awards and Honors:

ExxonMobil Solid State Chemistry Fellowship (2008)

Research Corporation Cottrell Scholar Award (2007)

DuPont Young Professor (2007)

MIT Technology Review TR35 Award (Top 35 Young Innovators under the age of 35) (2006)

NSF CAREER Award (2006)

3M Nontenured Faculty Award (2006)

MRS Fall Meeting Poster Award (2006) (Presenting author was graduate student Andrew Schmitt)

Cornell University Graduate School Travel Grants (2001)

Peking University Student Research Scholarship (1996)

Excellent Student in Honors Science Program (1996)

Outstanding Student Scholarship, Peking University (1995&1994)

Gold Medal in Chinese National Chemistry Olympiad (1992)

Teaching and Educational Outreach:

Courses taught:

Chemistry of Nanoscale Materials (Chem 630) Fall 2005, Spring 2008

Fundamentals of Analytical Sciences (Chem 329) Spring 2007, Fall 2006, Spring 2006, Fall 2007

Fundamentals of Analytical Sciences (Chem 327) Spring 2005, Fall 2004

Curriculum development and outreach activities:

Developed a web course on nanoscience and nanotechnology for high school teachers in collaboration with Prof. John Moore and graduate student Janice Hall

Open-house, lab tour, and on-line chats for high school teachers participating in the on-line course for nanoscience and nanotechnology

Discovering Nanoscience ("Nano Bootcamp") Workshop for a group of high school students from Conserve School (Jan 2008)

Guest lecturer on nanoscience and nanomaterials in Chem 104 (Feb 2008)

Lab tour and interactions with students with disability from Midwest Alliance for Science and Technology (Oct 2006 & Jan 2007)

Invited to write a perspective on nanoelectronics for Technology Review magazine (September 2006)

Developed a new graduate course (Chem 630: Chemistry of Nanoscale Materials Fall 2005)

Professional Affiliation and Synergistic Activities:

1. Organized a symposium on 1-D nanomaterials in 233rd ACS National meeting;

- Program organizing committee for SPIE Optics East 2007: Nanomaterials Synthesis, Interfacing, and Integrating in Devices, Circuits, and Systems II;
Local program committee for 65th Physical Electronic Conference (PEC) in 2005.
- Memberships: American Chemical Society; Materials Research Society, American Physical Society
 - Proposal Reviewers: NSF, PRF, Research Corporation, Austrian Science Fund, Belgian Science Policy Office (BELSPO)
 - Journal referees: *J. Am. Chem. Soc.* (19 papers), *Nano Lett.* (11), *Chem. Mater.* (8), *Adv. Mater.*, *J. Phys. Chem.* (9), *Inorg. Chem.* (2), *Small* (4), *ACS Nano*, *Langmuir*, *Materials Today*, *Nanotechnology* (3), *J. Solid State Chem.*, *J. Mater. Res.*, *Crys. Growth. Design*, *J. Crys. Growth.*, *Electrochem. Solid-State Lett.*, *J. Nanosci. and Nanotech.*, *Mater. Sci. Eng.*, *Thin Solid Films*, *Solid State Sci.*, *J. Vac. Sci. Tech.*

Publications:

at UW-Madison

- Bierman, M. J.; Lau, Y. H. A.; Kvit, A. V.; Schmitt, A. L.; Jin, S.; "Dislocation Driven Nanowire Growth and Eshelby Twist" *Science express*, DOI: 10.1126/science.1157131.
- Szczeczek, J. R.; Jin, S. "Mg₂Si Nanocomposite Converted from Diatomaceous Earth as a Potential Thermoelectric Material" *accepted*. (Invited contribution to the Special Issue of *J. Solid State Chem.* entitled "Solid State Chemistry on the Nanoscale: Achievements, Challenges, and Opportunities".
- Song, Y.; Schmitt, A. L.; Jin, S. "Spin-Dependent Transport in Half-Metallic CrO₂ Nanorod Devices" *in revision*.
- Tomasik, J. H.; Jin, S.; Hamers, R. J.; Moore, J. W.; "Design and Initial Evaluation of an Online Nanoscience Course for Teachers" *in revision*.
- Schmitt, A. L.; Jin, S. "Chemical Synthesis and Magneto-transport of Magnetic Semiconducting Fe_{1-x}Co_xSi Alloy Nanowires" *Nano Lett.* **2008**, 8, 810-815.
- Amos, F. F.; Morin, S. A.; Streifer, J. A.; Hamers, R. J.; Jin, S. "Photodetector Arrays Directly Assembled onto Polymer Substrates from Aqueous Solution" *J. Am. Chem. Soc.* **2007**, 129, 14296-14302.
- Morin, S. A.; Amos, F. F.; Jin, S. "Biomimetic Assembly of Zinc Oxide Nanorods on Flexible Polymers" *J. Am. Chem. Soc.* **2007**, 129, 13776-13777.
- Bierman, M. J.; Lau, Y. H. A.; Jin, S.; "Hyperbranched PbS and PbSe Nanowires and the Effect of Hydrogen Gas on Their Synthesis" *Nano Lett.* **2007**, 7, 2907-2912.
- Zhou, F.; Szczeczek, J. R.; Moore, A. L.; Jin, S.; Shi, L. "Determination of Transport Properties in Chromium Disilicide Nanowires via Combined Thermoelectric and Structural Characterizations" *Nano Lett.*, **2007**, 7, 1649-1654.
- Szczeczek, J. R.; Schmitt, A. L.; Bierman, M. J.; Jin, S. "Single-Crystal Semiconducting Chromium Disilicide Nanowires Synthesized via Chemical Vapor Transport" *Chem. Mater.* **2007**, 19, 3238-3243.
- Song, Y.; Jin, S. "Synthesis and Properties of Metallic β₃-Ni₃Si Nanowires" *Appl. Phys. Lett.*, **2007**, 90, 173122.
- Song, Y.; Schmitt, A. L.; Jin, S. "Ultralong Single Crystal Metallic Ni₂Si Nanowires with Low Resistivity" *Nano Lett.*, **2007**, 7, 965-969.
- Bierman, M. J.; Van Heuvelen, K. M.; Schmeißer, D.; Brunold, T. C.; Jin, S. "Ferromagnetic Semiconducting EuO Nanorods" *Adv. Mater.* **2007**, 19, 2677-2681.
- Schmitt, A. L.; Jin, S. "Selective Patterned Growth of Silicide Nanowires without the Use of Metal Catalysts" *Chem. Mater.* **2007**, 19, 126-128.
- Jin, S. "Nanotechnology – the Future of Nanoelectronics" *Technology Review* **2006**, 104, Sept-Oct, 26. (Invited commentary).
- Schmitt, A. L.; Zhu, L.; Schmeißer, D.; Himpfel, F. J.; Jin, S. "Metallic Single-Crystal CoSi Nanowires via Chemical Vapor Deposition of Single-Source Precursor" *J. Phys. Chem. B.* **2006**, 110, 18142-18146.

18. Schmitt, A. L.; Bierman, M. J.; Schmeißer, D.; Himpsel, F. J.; Jin, S. "Synthesis and Properties of Single-Crystal FeSi Nanowires" *Nano Lett.* **2006**, *6*, 1617-1621.

Prior to UW-Madison

17. Oertel, C. M.; Rayburn, L. L.; Jin, S.; DiSalvo, F. J. "Monotopic binding modes for ditopic ligands: synthesis and characterization of $W_6S_8L_6$ cluster compounds." *Comptes Rendus Chimie* **2005**, *8*, 1779-1788.
16. Zheng, G; Lu, W.; Jin, S.; Lieber, C. M. "Doping and electrical transport in n-type silicon nanowires" *Adv. Mater.* **2004**, *16*, 1890-1893.
15. Whang, D.; Jin, S.; Lieber, C. M. "Large-scale hierarchical organization of nanowires for functional nanosystems" *Jap. J. Appl. Phys. Part 1.* **2004**, *43*, 4465-4470.
14. Jin, S.; Whang, D.; McAlpine, M. C.; Friedmann, R. S.; Wu, Y. Lieber, C. M. "Scalable interconnection and integration of nanowire devices without registration" *Nano Lett.* **2004**, *4*, 915-919.
13. McAlpine, M. C.; Friedmann, R. S.; Jin, S.; Lin, K. H.; Wang, W. U.; Lieber, C. M. "High-performance nanowire electronics and photonics on glass and plastic substrates" *Nano Lett.* **2003**, *3*, 1531-1535.
12. Whang, D.; Jin, S.; Wu, Y.; Lieber, C. M. "Large-scale hierarchical organization of nanowire arrays for integrated nanosystems" *Nano Lett.* **2003**, *3*, 1255-1259.
11. Whang, D.; Jin, S.; Lieber, C. M. "Nanolithography using hierarchically assembled nanowire masks" *Nano Lett.* **2003**, *3*, 951-954. (contributed equally)
10. Jin, S.; Adamchuk, J.; Xiang, B. and DiSalvo, F. J. "The dean-evans relation in ^{31}P NMR spectroscopy and its application to the chemistry of octahedral tungsten sulfide clusters" *J. Am. Chem. Soc.* **2002**, *124*, 9229-9240.
9. Jin, S. and DiSalvo, F. J. "3-D Coordination network structures constructed from $[W_6S_8(CN)_6]^{6-}$ anions" *Chem. Mater.* **2002**, *14*, 3448-3457.
8. Jin, S. Popp, F.; Boettcher, S. W.; Yuan, M.; Oertel, C. M.; DiSalvo, F. J. "Synthesis, characterization and properties of $Mo_6S_8(4\text{-tert-butylpyridine})_6$ and related $M_6S_8L_6$ cluster complexes (M = Mo, W)" *J. Chem. Soc. Dalton Trans.* **2002**, 3096-3100.
7. Jin, S. and DiSalvo, F. J. "Novel octahedral tungsten sulfidocyanide cluster anion $[W_6S_8(CN)_6]^{6-}$ " *Chem. Comm.* **2001**, 1586-1587.
6. Jin, S.; Zhou, R.; Scheuer, E. M.; Adamchuk, J.; Rayburn, L. L.; DiSalvo, F. J. Synthesis, characterization and ligand exchange studies of $W_6S_8L_6$ cluster compounds. *Inorg. Chem.* **2001**, *39*, 2666-2674. (featured on the cover)
5. Hill, L. I.; Jin, S.; Zhou, R.; Venkataraman, D.; DiSalvo, F. J. "Synthesis and characterization of oxidized $W_6S_8L_6$ clusters" *Inorg. Chem.* **2001**, *39*, 2660-2665.
4. Sogah, D. Y.; Weimer, M. W.; Jin, S.; DiSalvo, F. J.; Venkataraman, D. "Polystyrene star nanostructures with molybdenum and tungsten clusters core" *Polym. Mater. Sci. Eng.* **2001**, *84*, 845-846.
3. Jin, S.; Venkataraman, D.; DiSalvo, F. J. "Ligand substitution reactions of $W_6S_8L_6$ with tricyclohexylphosphine: ^{31}P NMR and structural studies of $W_6S_8(PCy_3)_n(4\text{-tert-butylpyridine})_{6-n}$ ($0 < n \leq 6$) complexes" *Inorg. Chem.* **2000**, *39*, 2747-2757.
2. Jin, S.; Venkataraman, D.; DiSalvo, F. J.; Peters, E. C.; Svec, F.; Fréchet, J. M. J. "Novel catalytic metal clusters supported by porous polymer monolith" *Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.)* **2000**, *41*, 458-459.
1. Venkataraman, D.; Rayburn, L. L.; Hill, L. I.; Jin, S.; Malik, A.-S.; Turneau, K. J.; DiSalvo, F. J. "An improved high yield synthesis procedure and reactivity of $W_6S_8(4\text{-tert-butylpyridine})_6$ " *Inorg. Chem.* **1999**, *38*, 828-830.

Patents:

2. Jin, S.; Schmitt, A. L.; Song, Y. "Metal silicide nanowires and methods for their production" *US Patent 11/506,147, pending*.
1. Lieber, C. M. ; Whang, D.; Jin, S.; Wu, Y.; McAlpine, M. C.; Friedmann, R. S. "Nanoscale arrays, robust nanostructures, and related devices" *US Patent 10/995,075, pending*.

Invited Presentations:

23. "Dislocation Driven Nanowire Growth" 236th ACS Fall meeting, ExxonMobil Solid State Chemistry Fellowship Award Symposium, Philadelphia, PA, to be completed in August 2008. (Invited talk)
22. "TBD" 14th Annual Cottrell Scholar Conference, Tucson, Arizona, to be completed in July 2008. (Invited poster?).
21. "Dislocation Driven Nanowire Growth", Max-Planck Institute, International School of Nanoscience and Nanotechnology, Halle, Germany, to be completed in June 2008. (Invited talk)
20. "Biomimetic Assembly of Functional Nanomaterials" Particles 2008, Orlando, FL, to be completed in May 2008. (Invited talk)
19. "Dislocation Driven Nanowire Growth" U. of Central Florida, Orlando, FL, to be completed in May 2008. (Invited talk)
18. "General Chemical Synthesis of Silicide Nanowires and a New Nanowire Formation Mechanism" Indiana University, Bloomington, IN, April 2008. (Invited talk)
17. "Transition Metal Silicide Nanowires", 2008 TMS (The Minerals, Metals & Materials Society) Annual Meeting Hume-Rothery Symposium - Nanoscale Phases, New Orleans, LA, March 2008. (Invited talk)
16. "How to Make a Christmas Tree: General Chemical Synthesis of Silicide Nanowires and a New Nanowire Formation Mechanism" Purdue University, West Lafayette, IN, Feb 2008. (Invited talk)
15. "How to Make a Christmas Tree: General Chemical Synthesis of Silicide Nanowires and a New Nanowire Formation Mechanism" Bell Labs of Lucent Technologies, Murray Hills, NJ, Jan 2008. (Invited talk)
14. "How to Make a Christmas Tree: General Chemical Synthesis of Silicide Nanowires and a New Nanowire Formation Mechanism" City College of New York, New York, Jan 2008. (Invited talk)
13. "How to Make a Christmas Tree: General Chemical Synthesis of Silicide Nanowires and Complex Nanowire Structures" Boston College, Nov 2007. (Invited talk)
12. "General Chemical Synthesis of Transition Metal Silicide Nanowires" *NSF Inorganic Chemistry Workshop*, Jackson Hole, WY, June 2007. (Invited talk)
11. "General Chemical Synthesis of Transition Metal Silicide Nanowires" *North American Solid State Chemistry Conference 2007*, College Station, TX, May 2007. (Invited talk)
10. "General Synthesis of Metal Silicide Nanowires and Their Potential Applications in Thermoelectrics" General Motors Corporation, Warren, MI, May 2007. (Invited talk)
9. "Biomimetic Assembly of Functional Nanoscale Materials from Solution" 233rd ACS National Meeting, Chicago, IL, March 2007. (Invited talk)
8. "Transition Metal Silicide Nanowires" Howard University, Washington D.C., Feb 2006.
7. "Ferromagnetic Semiconducting Silicide Nanowires for Spintronics" *Tulane University*, New Orleans, LA, November 2006.
6. "Ferromagnetic Semiconducting Silicide Nanowires for Spintronics" *Louisiana State University*, Baton Rouge, LA, November 2006.
5. "Transition Metal Silicide Nanowires" *ACS Mid-west Regional Meeting*, Quincy, IL, October 2006.
4. "Transition Metal Silicide Nanowires" 14th *NSF Workshop on Materials Chemistry and Nanoscience*, St. Louis, MO, Oct 2006.
3. "Synthesis, Characterization and Physical Properties of Transition Metal Silicide Nanowires" *SPIE Optics East 2006*, Boston, October 2006.

2. "Synthesis, Characterization and Physical Properties of Transition Metal Silicide Nanowires" 3M Corporation, St. Paul, MN, June 2006.
1. "Hierarchical organization of nanowires for integrated nanoelectronic and nanophotonic systems" *MRS Fall Meeting*, Boston. December 2003.

Thesis Advisor and Postgraduate Associate Sponsor:

1. *Graduate*: Andrew Schmitt (01/05-), Matthew Bierman (11/04-), Jeannine Szczech (11/05-), Stephen Morin (11/05-), Jeremy Higgins (11/05-), Rachel Selinsky (11/06-), Y. K. Albert Lau (1/07-).
2. *Visiting Graduate Student*: Fan (Julien) Yang (10/08 -).
3. *Past Postgraduate*: Dr. Yipu Song (Ph.D. in Physics, 12/05-06/07), Dr. Fairland Amos (1/06-06/07).
4. *Undergraduate*: Davin Chernak (01/08 -); Stephen Lee (10/07 -); Jonathan Tong (01/06-); Cory Nelson (02/07-), Jean E. Calderón (5/07-8/07, NSEC REU from U. of Puerto Rico), Adam K. Schmitt (5/07-8/07, NSEC REU from Ball State U.); Andrew A. Lafko (01/05-12/06), David A. Maenner (01/05-05/06); Julie Feld (03/06-08/06).
5. *Past Graduate Student*: Lei Zhu (11/05-12/06), Pinray Huang (M.S. 11/04-6/07)

Student Awards and Honors:

Research Excellence in Materials Chemistry, Matthew Bierman (2008)
MRS Student Silver Award, Andrew Schmitt (2008)
MRS Spring meeting Poster Award, Andrew Schmitt (2008)
Outstanding Chemistry Teaching Awards, Jeannine Szczech (2008)
3M Graduate Fellowship, Stephen Morin (2007)
Air Product Graduate Fellowship, Matt Bierman (2007)
MRS Fall meeting Poster Award, Andrew Schmitt (2006)
APS User Meeting Poster Award, Andrew Schmitt (2006)