Curriculum Vitae

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Education

B.S. in Chemistry, Wuhan University, China, GPA 4.0, August 1982
Ph.D. in Chemistry, University of California, Berkeley, CA, GPA 4.0, June 1993

Professional appointments

1991 – 1993	Research Chemist, Chevron Chemical Company
1993 – 2005	Senior Research Scientist, Material Science Department, Pacific Northwest National Laboratory
2003 – 2009	Adjunct Associate Professor, Materials Science Program, Washington State University
2005 – 2009	Chief Scientist, Division of Fundamental Science, Pacific Northwest National Laboratory
2009 – Present	Lecturer, Department of Chemistry, Brown University

Awards and Recognitions

- R&D 100 Awards (1998).
- Discover Magazine Awards Finalist (1998).
- DOE Materials Science Award (1998).
- Pacific Northwest National Laboratory Environmental Health Science Division Outstanding Performance Award (2000).
- Pacific Northwest National Laboratory Outstanding Team Performance Award (2000), "Low K Mesoporous Dielectrics."
- Pacific Northwest National Laboratory Outstanding Team Performance Award (2001), "Development of a Commercially Viable NTP-Catalyst NO_x Reduction Technology."
- Pacific Northwest National Laboratory Energy Science and Technology Directorate Outstanding Performance Award for Outstanding Research Progress Funded by the Office of Basic Energy Sciences (2002).
- Pacific Northwest National Laboratory Energy Science and Technology Directorate Outstanding Performance Award for "Design, Synthesis and Characterization of Solution Templated Nanoarchitectured Materials" (2003).
- Exceptional Contribution Award (2003).
- Pacific Northwest National Laboratory Energy Science and Technology and Fundamental Science Directorate Outstanding Performance Award for Outstanding Project Research-DOE Basic Energy Sciences (2004).
- Pacific Northwest National Laboratory Energy Science and Technology and Fundamental Science Directorate Outstanding Performance Award for "developing and implementing

^{129}Xe NMR spectroscopy at PNNL (2008).

Publication:

104. L. -Q. Wang, D. Wang, J. Liu, G. J. Exarhos, " Probing Porosity and Pore Interconnectivity in Self-Assembled TiO_2–Graphene Hybrid Nanostructures Using Hyperpolarized ^{129}Xe NMR," J. Phys. Chem. C, in press.

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4. Z. Q. Huang, L. Q. Wang, A. E. Schach von Wittenau, Z. Hussain, D. A. Shirley, "Angle-Resolved Photoemission Extended Fine Structure Study of p(2x2) K/Ni(111)," *Phys. Rev. B* **47**, 13626 (1992).

3. A.E. Schach von Wittenau, L. Q. Wang, Z. Q. Huang, Z. Hussain, D. A. Shirley, "Reevaluation of the p(2x2) S/Cu(001) Structure Using Temperature-Dependent Angle-Resolved Photoemission Extended Fine Structure," *Phys. Rev. B* **45**, 13614 (1992).

2. L. Q. Wang, A. E. Schach von Wittenau, L. S. Wang, Z. Q. Huang, D. A. Shirley, "A Detailed Study of c(2x2)Cl/Cu(001) Adsorbate Geometry and Substrate Surface Relaxation Using Temperature-Dependent Angle-Resolved Photoemission Extended Fine Structure," *Phys. Rev. B* **44**, 1292 (1991).

1. L. Q. Wang, Z. Q. Huang, A. E. Schach von Wittenau, Z. Hussain, D. A. Shirley, "The Surface Structural Determination of sq(3)xsq(3) R30^{o} Cl/Ni(111) Using Temperature-Dependent Angle-Resolved Photoemission Extended Fine Structure," *Phys. Rev. B* **44**, 13711 (1991).

Presentations

L.-Q. Wang, G. J. Exarhos, A. Karkamkar, T. Autrey, "Probing Porosity and Pore Interconnectivity in Nanophase Ammonium Borane in Mesoporous Silica Using HP ^{129}Xe NMR." 50th Rocky Mountain Conference On Analytical Chemistry," Breckenridge, CO. July 2008.

L.-Q. Wang, D. Wang, J. Liu, G. J. Exarhos, S Pawsey, IL Moudrakovski, " Probing Porosity and Pore Interconnectivity in Highly Crystalline Mesoporous TiO_2 Using Hyperpolarized ^{129}Xe NMR." 50th Rocky Mountain Conference On Analytical Chemistry," Breckenridge, CO. July 2008.

Wang LQ, GJ Exarhos, S Pawsey, IL Moudrakovski, and JA Ripmeester. 2007. "Hyperpolarized 129Xe Nuclear Magnetic Resonance Investigation of Molecularly Organized Nanostructural Materials." Abstract submitted to American Chemical Society 234th National Meeting & Exposition, Boston, MA. PNNL-SA-54387.

Wang LQ, C Yao, X Zhou, CF Windisch, Jr, LR Pederson, and GJ Exarhos. 2007. "Probing Hydrogen in ZnO Nanorods Using in situ Solid-State 1H NMR." Abstract submitted to American Chemical Society 234th National Meeting & Exposition, Boston, MA. PNNL-SA-54388.

Exarhos GJ, WD Samuels, Y Shin, LQ Wang, C Yao, and WM Risen. 2007. "Carbohydrate Templates for Engineering Nanostructures." Abstract submitted to Fundamental Synthesis Research Challenges for 21st Century Materials: Mechanism and Methods, Washington, DC. PNNL-SA-55274.

Wang LQ. 2006. "Nuclear Magnetic Resonance in Materials Research." Presented by Li-Qiong Wang (Invited Speaker) at Materials Science and Engineering Seminar at UW, Seattle, WA on March 6, 2006. PNNL-SA-46534.

Wang LQ. 2006. "NMR Investigation of Molecularly Organized Nanostructural Materials." Presented by Li-Qiong Wang at International Symposium on Xenon NMR of Materials at National Research Council, Steacie Institute for Molecular Sciences, Ottawa, Ontario, Canada, June 1-3, 2006.

Wang LQ. 2006. "Temperature Dependent High Resolution ^{1}H MAS NMR Studies of ZnO Nanorods." Presented by Li-Qiong Wang at 47th Experimental Nuclear Magnetic Resoancne Conference, Asilomar Conference Center, Pacific Grove, CA, April 23-28, 2006.

Chemistry and Material Science Department Seminar, Washington State University, Pullman, WA, Sept. 9, 2005. Invited Talk: Nuclear Magnetic Resonance in Materials Research.

The 52st National Symposium American Vacuum Society, Boston, MA, Oct.30-Nov. 4, 2005. Presentation: Adsorption and Reaction of CO and CO_2 on Oxidized and Reduced $SrTiO_3$(100) Surfaces.

National Research Council, Steacie Institute for Molecular Sciences, Ottawa, Ontario, Canada, April, 19, 2005. Invited Talk: Investigation of Molecularly Organized Nanostructural Materials.

The 51st National Symposium American Vacuum Society, Anaheim, CA, Nov. 14-19,2004. Talk: Adsorption and Reaction of Acetaldehyde and Methanol on Stoichiometric and Defective Mixed-Metal Oxide Surface.

Physics Department Seminar, Portland State University, Portland, OR, Nov. 1, 2004. Invited Talk: Investigation of Molecularly Organized Nanostructural Materials.

26th Annual Symposium on Applied Surface Analysis, Richland, WA, June 15-18, 2004, Talk: Probing the Geometry and Interconnectivity of Nano-Pores in Organic Aerogels Using Hyperpolarized 129Xe NMR spectroscopy.

26th Annual Symposium on Applied Surface Analysis, Richland, WA, June 15-18, 2004, Presentation: Adsorption and Reaction of Oxygenated Hydrocarbons on Stoichiometric and Defective Mixed-Metal Oxide Surface.

45th Rocky Mountain Conference on Analytical Chemistry, Denver, CO, July 27-31, 2003. Invited Talk: Magnetic Resonance Studies of Hierarchically Ordered Replicas of Wood Cellular Structures Prepared by Surfactant-Mediated Mineralization.

Third IEEE Conference on Nanotechnology, San Francisco, CA, Aug. 12-14, 2003. Presentation: Dynamic π-π Stacked Molecular Nanostructures Emit from Green and Red Color**.**

DOE Nanoscience Workshop, Sante Fe, New Mexico, Sept. 29-Oct 1, 2002. Invited talk: NMR Investigation of Molecularly Organized Nanostructural Materials.

Chemistry and Material Science Department Seminar, Washington State University, Pullman, WA, Oct. 11, 2002. Invited Talk: Investigation of Molecularly Organized Nanostructural Materials.

Northwest American Chemical Society Meeting, Spokane, WA, June20-23, 2002. Talk: Investigation of Local Molecular Ordering in Layered Surfactant-Silicate Mesophases.

EMSL 2002 User Meeting, PNNL, Richland, WA, May 21-22, 2002. Invited talk: Adsorption and Reaction of Acetaldehyde and Nitric Oxide on $SrTiO_3$ Surfaces.

223rd American Chemical Society National Meeting, Orlando, FL, April 7-11, 2002. Presentations: ^{129}Xe NMR Study of Functionalized Ordered Mesoporous Silica; Investigation of Local Molecular Ordering in Layered Surfactant-Silicate Mesophases.

Nanoscale Science and Technology Workshop, University of Washington, Seattle, WA, August16-17, 2001. Invited talk: Molecular Assembly In Ordered Nanoporosities.

48th International Symposium American Vacuum Society, San Francisco, CA, Oct. 29-Nov. 2, 2001. Talk: Surface Structure Influence on Reactivity of Small Molecules on $SrTiO_3$(100) Surfaces.

221st American Chemical Society National Meeting, San Diego, CA, April 1-5, 2001.
Talk: Multi-Nuclear Magnetic Resonance Investigation of Molecular Assembly in Ordered Nanoporosities.

221st American Chemical Society National Meeting, San Diego, CA, April 1-5, 2001. Presentation: Adsorption and Dissociation of Water and Methanol on Stepped $SrTiO_3$(100) surfaces.

220th American Chemical Society National Meeting, Washington D.C, August 20-24, 2000. Presentation: Solid-state NMR Investigation of Molecular Assembly In Ordered Nanoporosities.

220th American Chemical Society National Meeting, Washington D.C, August 20-24, 2000. Presentation: A Comparative Study for Small-molecule Adsorption onto Stoichiometric and Defective TiO_2 and $SrTiO_3$ Surfaces.

Pacifichem 2000, Honolulu, Hawaii, Dec. 14 - 19, 2000. Presentation: Interaction of Small Molecules with Stoichiometric, Stepped, and Reduced $SrTiO_3$(100) Surfaces.

42nd Rocky Mountain Conference on Analytical Chemistry", Omni Interlocken Resort, Broomfield, Colorado, July 30-Aug. 3, 2000. Presentation: Investigation of Molecular Assembly In Ordered Nanoporosities Using Solid State NMR.

Materials Research Society Fall Meeting, Boston, MA, Nov.27-Dec.1, 2000. Talk: Structure-Property Relationships for Small Molecule Adsorption on TiO_2 and $SrTiO_3$ Surfaces.

The 46th National Symposium American Vacuum Society, Seattle, WA, Oct. 25-29,1999. Talk: Interactions of HCOOH on Stoichiometric and Reduced $SrTiO_3$(100) Surfaces.

54th Northwest Regional Meeting of the American Chemical Society, Portland, WA, June 17-20, 1999. Talk: Solid State NMR Studies of Chemistry of Molecularly Engineered Nano-Materials Through Templating.

Pacific Northwest American Vacuum Society Symposium, Richland, WA, June 21-24, 1999. Talk: Interactions of H_2O and HCOOH with $SrTiO_3$(100) Surfaces.

Materials Research Society Fall Meeting, Boston, MA, Nov. 27, 1999. Talk: Solid-State NMR and Molecular Modeling Investigation of the Molecular Conformations of Long-Chain Alkanoic Acid Self-Assembled on Oxide Surfaces.

40th Rocky Mountain Conference on Analytical Chemistry", Denver, CO, July 25-Aug. 1, 1998. Presentation: Solid State NMR Studies of Conformation and Dynamics of Surfactant Molecules in Molecularly Organized Nanostructured Materials.

53rd Northwest Regional Meeting of the American Chemical Society, Pasco, WA, June 17-20, 1998. Talk: Solid State NMR Studies of Conformation and Dynamics of Functional Molecules in Molecularly Tailored Composites.

Pacific Northwest American Vacuum Society Symposium, Richland, WA, June 16-19, 1998. Talk: A Comparative Study for Interactions of Small Molecules with (100) SrTiO3 and with (100) and (110) TiO_2 Surfaces.

The 44th National Symposium American Vacuum Society, San Jose, CA, Oct. 20-24, 1997. Talk: Studies of Defect Chemistry on (110) and (100) TiO_2 Surfaces.

Pacific Northwest American Vacuum Society Symposium, Troutdale, Oregon, Sept. 18-20, 1997. Talk: Interactions of Liquid and Vapor Water with Stoichiometric and Defective (100) and (110) TiO_2 Surfaces.

213th American Chemical Society National Meeting, San Francisco, CA, April 13, 1997. Talk: Applications of NMR in Characterization of Advanced Phosphate Ceramics.

213th American Chemical Society National Meeting, San Francisco, CA, April 13, 1997. Presentation: Studies of the Defect Chemistry of TiO2 Surfaces.

Materials Research Society Spring Meeting, San Francisco, CA, April 8-12, 1996. Talk: The Interaction of Liquid and Vapor Water With Nearly Defect-Free and Defective TiO_2(100) Surfaces.

Materials Research Society Spring Meeting, San Francisco, CA, April 8-12, 1996. Presentation: Structure and Dynamics of Functional Molecules in Porous Ceramics Studied Using Multinuclear Solid State Nuclear Magnetic Resonance.

38th Rocky Mountain Conference on Analytical Chemistry", Denver, Colorado, July 21-26, 1996. Presentation: Solid

State NMR Studies of The Structure and Dynamics of Functional Molecules in Porous Ceramics.

Pacific Northwest American Vacuum Society Symposium, Troutdale, Oregon, Sept. 18-20, 1996. Talk: Interactions of HCOOH with Stoichiometric and Defective TiO_2(110) Surfaces.

209th American Chemical Society National Meeting, Anaheim, CA, April 2-6, 1995. Talk: The Reactivity of Defects on TiO_2 Surfaces.

42nd National Symposium American Vacuum Society, Minneapolis, MN, Oct. 16-20, 1995. Talk: Interactions of Small Molecules with TiO_2(110) Surfaces: The Role of Defects.

Pacific Northwest American Vacuum Society Symposium, Troutdale, Oregon, Sept. 19-21, 1995. Talk: AFM, LEED, and XPS of TiO_2(100) Surfaces.

37th Rocky Mountain Conference on Analytical Chemistry, Denver, Colorado, July 23-27, 1995. Presentation: Investigations of the Structure and Dynamics of Surfactant Molecules During Nucleation of Mesophase Silicates Using Solid-State NMR.

The 47th Pacific Coast Regional Meeting of the American Ceramic Society, Seattle, WA, Nov. 1-3, 1995. Invited Talk: Applications of Solid State NMR in Synthesis of Advanced Ceramic Composites.

Materials Research Society Fall Meeting, Boston, MA, November 29 to December 3, 1994. Talk: The Adsorption of Liquid and Vapor Water on TiO_2 (110) Surfaces: The Role of Defects.

Pacific Northwest AVS Symposium, Troutdale, Oregon, Sept. 15-17, 1994. Talk: The Adsorption of Liquid and Vapor Water on TiO_2 (110) Surfaces: The Stability of Defects.

Gordon Research Conference, Plymouth, NH, July 18-22, 1994. Presentation: The Reactivity of Defects in the Adsorption of Liquid and Vapor Water on TiO_2 (110) Surfaces.

Pacific Northwest AVS Symposium, Seattle, WA, Sept. 16-17, 1993. Talk: E-Beam Induced Defect States on TiO_2(110).

17th Annual SSRL Users Group Meeting, Menlo Park, CA., October 1990. Presentation: Chemisorption Geometry of sq(3)xsq(3) R30^o Cl/Ni(111).

Ninth International Conference on Vacuum Ultraviolet Radiation Physics, Honolulu, HI, July, 1989. Talk: Temperature Dependent ARPEFS Study of c(2x2) Cl/Cu(001).

Teaching and Services:

Chem 0330 Laboratory courses enrolling about 650 students in each academic year.
Spring 2010; Fall 2010, Spring 2011, Fall 2011

Undergraduate Advisors for freshmen and sophomores at Brown University
Academic Year of 2010 (6 freshmen and 1 sophomores)
Academic Year of 2011 (6 freshmen and 5 sophomores)

Ad-Hog committee member for curriculum development

Volunteer in helping Brown freshmen tutoring high school students in local areas
Volunteer in the minority prospective student's recruitment (2011)

Curriculum Development:

Developed several new labs and made an online Chem. 0330 lab manual. New fuel cell experiments have been developed and introduced to the freshmen chem. Labs with more than

430 students in the fall. Significantly revised the existing labs.

Research Grants:
DOE BES programs –Co-PI (Oct. 1-1993- Oct. 1, 2009)
DOE EPSCOR –Co-PI (Oct.1 2011-Current)

Synergistic Activities

Dr. Li-Qiong Wang joined Brown chemistry department in Jan. 2010. Recently she has incorporated the PEM fuel cell technology into a freshmen chemistry laboratory course. During last 17 years working with Pacific Northwest National Laboratory (PNNL), she was a co-principal investigator in DOE Basic Energy Science Programs and has mentored several graduate students over the course of her research career. Her expertise is in the areas of surface science (UHV, STM, AFM, TPD, XPS, EXAFS), nanostructural materials (synthesis of novel nanostructured materials) and nuclear magnetic resonances (both liquid and solid state NMR techniques). She has pioneered the use of ^{129}Xe NMR on mesoporous materials. She was also a principal investigator in the PNNL Laboratory's Directed Research and Development program in exploring novel NMR/MRI techniques for in situ diagnostics of gas and water transport in operating PEM fuel cells. She was the first to use ^{3}He MRI technique for in-situ monitoring of gas flow in an operating PEM fuel cell and quantitative mapping of H_2 fuel utilization. She and her co-workers have been developing an in-situ portable device for rapid monitoring biomass degradation processes.

Collaborators & Other Affiliations

Collaborators: T. Baumann (LLNL), Mark Engelhard (PNNL), Greg Exarhos (PNNL), Kim Ferris (PNNL), Glen Fryxell (PNNL), Alex D. Li (Washington State University), Burt Lee (Clemson University), Jun Liu (PNNL), Paul Major (PNNL), Shas Mattigod (PNNL), Peter McGrail (PNNL), David McCready PNNL), Kevin Minard (PNNL), Igor Moudrakovski (NRC, Canada), Bruce Palmer (PNNL), Chuck Peden (PNNL), Peter Rieke (PNNL), John Ripmeester (NRC, Canada), William Samuels (PNNL), Yongsoon Shin (PNNL), Vish Vishwanathan (PNNL), Omar M. Yaghi (UCLA, CA).

Service to the Scientific and Engineering Community: Member of the American Chemical Society, Materials Research Society, and American Vacuum Society.

Graduate and Postdoctoral Advisors

Graduate: David A. Shirley (UC Berkeley)