

Sheng Dai

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Chemical Functionality Group
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Education

Zhejiang University, Zhejiang Province, P.R. China	Chemistry	B.S., 1984
Zhejiang University, Zhejiang Province, P.R. China	Inorganic Chemistry	M.S., 1986
University of Tennessee, Knoxville, TN	Chemistry	Ph.D., 1990

Research Interests

Nanoporous and nanostructured materials, ionic liquids, separation, catalysis, and radiation detection.

Professional Experience

2006–p Group Leader, Nanomaterials Chemistry Group, Chemical Sciences Division (CSD), Oak Ridge National Laboratory (ORNL)
2006–p Adjunct Professor, Jilin University, Changchun, China
2005–p Senior Research Staff Member, Chemical Functionality Group, Center for Nanophase Materials Sciences, ORNL
2005 Visiting Professor, Denmark Technical University
2001–2006 Senior Research Staff Member, CSD, ORNL
1993–2000 Staff Scientist, Chemical Technology Division, ORNL
1998–p Adjunct Professor, Drexel University, Philadelphia, PA
1997–p Adjunct Professor, University of Tennessee, Knoxville, TN
1990–1993 Postdoctoral Research Associate, ORNL

Professional and Synergistic Activities:

2005–p Member, *American Chemical Society*, *Electrochemical Society*

Honors and Awards

2005 CSD Significant Achievement in Nanomaterials
2004 CSD Significant Achievement in Nanomaterials
2002 Battelle S&T Challenges Award

Selected Patents (5 patents granted and 8 patents pending)

“Composite Solid-State Scintillators for Neutron Detection,” S. Dai, H. Im, and M. D. Pawel, U.S. Patent No. 7,105,832, Sept. 12, 2006.
“Imprint-Coating Synthesis of Selective Functionalized Ordered Mesoporous Sorbents for Separation and Sensors,” S. Dai, M. C. Burleigh, and Y. S. Shin, U.S. Patent No. 6,251,280, Jun. 27, 2001.
“Fiberoptic Probe and System for Spectral Measurements,” S. Dai and J. P. Young, U.S. Patent No. 5,822,072, Oct. 13, 1998.

Selected Peer-Reviewed Publications (Author of >300 articles in refereed journals and books):

Qiao, Z. A.; Brown, S. S.; Adcock, J.; Veith, G. M.; Bauer, J. C.; Payzant, E. A.; Unocic, R. R.; Dai, S., “A Topotactic Synthetic Methodology for Highly Fluorine-Doped Mesoporous Metal Oxides,” *Angew. Chem.-Int. Edit.* 51 (12), 2888-2893 (2012).

- Liu, R.; Mahurin, S. M.; Li, C.; Unocic, R. R.; Idrobo, J. C.; Gao, H. J.; Pennycook, S. J.; Dai, S., "Dopamine as a Carbon Source: The Controlled Synthesis of Hollow Carbon Spheres and Yolk-Structured Carbon Nanocomposites," *Angew. Chem.-Int. Edit*, 50, 6799-6802 (2011).
- Guo, B. K.; Wang, X. Q.; Fulvio, P. F.; Chi, M. F.; Mahurin, S. M.; Sun, X. G.; Dai, S., "Soft-Templated Mesoporous Carbon-Carbon Nanotube Composites for High Performance Lithium-ion Batteries," *Adv. Mater.* 23, 4661-4666. (2011).
- Wang, C. M.; Cui, G. K.; Luo, X. Y.; Xu, Y. J.; Li, H. R.; Dai, S., "Highly Efficient and Reversible SO₂ Capture by Tunable Azole-Based Ionic Liquids through Multiple-Site Chemical Absorption," *J. Am. Chem. Soc.* 133, 11916-11919 (2011).
- Wang, C. M.; Luo, X. Y.; Luo, H. M.; Jiang, D. E.; Li, H. R.; Dai, S., "Tuning the Basicity of Ionic Liquids for Equimolar CO₂ Capture," *Angew. Chem.-Int. Edit* 50, 4918-4922 (2011).
- Fulvio, P. F.; Mayes, R. T.; Wang, X. Q.; Mahurin, S. M.; Bauer, J. C.; Presser, V.; McDonough, J.; Gogotsi, Y.; Dai, S., "'Brick-and-Mortar' Self-Assembly Approach to Graphitic Mesoporous Carbon Nanocomposites," *Adv. Funct. Mater.* 21, 2208-2215 (2011a) .
- Zhai, Y. P.; Dou, Y. Q.; Zhao, D. Y.; Fulvio, P. F.; Mayes, R. T.; Dai, S., "Carbon Materials for Chemical Capacitive Energy Storage," *Adv. Mater.* 23, 4828-4850 (2011).
- Vlassiounk, I.; Regmi, M.; Fulvio, P. F.; Dai, S.; Datskos, P.; Eres, G.; Smirnov, S., "Role of Hydrogen in Chemical Vapor Deposition Growth of Large Single-Crystal Graphene," *ACS Nano* 5, 6069-6076 (2011) .
- Liu, H. S.; Bi, Z. H.; Sun, X. G.; Unocic, R. R.; Paranthaman, M. P.; Dai, S.; Brown, G. M., "Mesoporous TiO₂-B Microspheres with Superior Rate Performance for Lithium Ion Batteries," *Adv. Mater.* 23, 3450-+ (2011).
- Fulvio, P. F.; Brown, S. S.; Adcock, J.; Mayes, R. T.; Guo, B. K.; Sun, X. G.; Mahurin, S. M.; Veith, G. M.; Dai, S., "Low-Temperature Fluorination of Soft-Templated Mesoporous Carbons for a High-Power Lithium/Carbon Fluoride Battery," *Chem. Mater.* 23, 4420-4427 (2011).

Collaborators Outside ORNL During Past Two Years:

C. E. Barnes (Univ. of Tennessee, Knoxville); C. L. Hussey (Univ. of Mississippi); M. A. Markowitz (Naval Research Laboratory); R. D. Rogers (Univ. of Alabama); R. D. Sadoway (Mass. Inst. of Technology); Y. Wei (Drexel University); Z. L. Xui (Univ. of Tennessee, Knoxville); S. Yanopoulos (Inst. of Chem. Engr. & High Temperature Chemical Processes, Greece)

Thesis Advisor and Postdoctoral Advisors

Graduate Advisor: Prof. T. Ffrancon Williams (Univ. of Tennessee, Knoxville)
 Postdoctoral Advisors: Dr. J. P. Young (ORNL, deceased)
 Prof. G. M. Mamantov (Univ. of Tennessee, Knoxville, deceased)

Postgraduate-Scholar Sponsor:

M. C. Burleigh, Naval Research Laboratory, *deceased* (Ph.D., Chemistry, 2000, Univ. of Tennessee, Knoxville); C. D. Liang, Oak Ridge National Laboratory (Ph.D., Chemistry, 2005, Univ. of Tennessee, Knoxville); L. A. Ortiz, Honeywell (Ph.D., Molten Salts, 2001, Mass. Inst. of Technology); Y. S. Shin, Pacific Northwest National Laboratory (Chemistry, 1998, Univ. of Tennessee, Knoxville)

Postdoctoral Scholars (Current): Zhen Ma, Hongfeng Yin, Richard Mayes, Xiqing Wang, Jason Lee

Total Graduate Students Advised: 4

Total Postdoctoral Scholars Advised: 26