

# Curriculum Vitae - Professor Hongyou Fan

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## EDUCATION

**Postdoctoral Fellow** Sandia National Laboratories, 2000-2002

Research: Self-assembled nanoporous materials for catalysis, dielectrics coatings, and sensor fabrication

**Ph.D.** Chemical and Nuclear Engineering (May 2000), University of New Mexico  
Dissertation: Nanoporous Silica and Composite Based on Sol-Gel Processing and Surfactant/Block Copolymer Templating Approaches

**M.S.** Polymer Science (June 1995), Chinese Academy of Sciences  
Thesis: Synthesis, Characterization, and Properties of Biodegradable Polylactones

**B.S.** Chemistry (July 1990), Jilin University, Changchun, China  
Major: Organic Chemistry

## HONORS AND AWARDS

1. *Federal Laboratory Consortium* 2008 Mid-Continent Region - Outstanding Technology Development Award.
2. R&D magazine, R&D 100 Award 2007.
3. Laboratory Directed Research & Development (LDRD) Award for Excellence, Sandia National Laboratory, 2007.
4. Employee Recognition Award, Sandia National Laboratories, 2006.
5. Outstanding Faculty Mentor Award, The University of New Mexico, 2005.
6. Sandia Royalty Award, Sandia National Laboratories, 2002-2006.
7. Materials Research Society (MRS) Graduate Student Silver Award, 2000.
8. Outstanding Graduate Student Award, University of New Mexico, 2000.
9. 1st prize, Poster Competition, "Industrial Advisory Board" meeting, UNM/NSF Center for Micro-Engineered Materials (2000)

## PROFESSIONAL ACTIVITIES

- Member and contributor for the Implementation Plan for Chemical Industry R&D Roadmap for Nanomaterials by Design, April 2006.
- Member of American Chemical Society and Materials Research Society.
- Peer reviewer for scientific journals and proposal for varied funding agencies.
- Mentored 6 postdoctoral fellows, 12 college students, 2 high school students

## PUBLICATIONS

1. S. M. Dirk, S. W. Howell, B. K. Price, H. Fan, C. Washburn, D. R. Wheeler, J. M. Tour, J. Whiting, and R. J. Simonson, "Vapor sensing using conjugated molecule-linked Au nanoparticles in a silica matrix," *Journal of Nanomaterials*, accepted.
2. D. Dunphy, X. Li, J. Wang, C. J. Brinker, and H. Fan, "Dynamic investigation of gold nanocrystal assembly using in-situ grazing-incidence small-angle x-ray," *Langmuir*, 24 (19) 10575-10578, 2008.
3. D. B. Burckel, H. Fan, G. Thayler, D.D. Koleske, "Lithographically defined carbon growth templates for ELOG of GaN," *Journal of Crystal Growth*, v. 310, #12, 3113-3116, 2008.
4. H. Fan, "Nanocrystal-micelle: synthesis, self-assembly, and application," *Chemical Communications*, 12, 1383-1394, 2008 (**Invited feature article, on front cover**)
5. W. Jiang, Q. Fu, H. Fan, W. Wang, "An NBD fluorophore-based sensitive and selective fluorescent probes for zinc ion," *Chemical Communications*, 2, 259-261, 2008.
6. W. Jiang, Q. Fu, H. Fan, J. Ho, W. Wang, "A highly selective fluorescent probe for thiophenols," *Angewandte Chemie International Edition*, 46, 8445-8448, 2007
7. A. T. Rodriguez, X. Li, J. Wang, W. A. Steen, and H. Fan, "Facile synthesis of nanostructured carbon through self-assembly between block copolymers and carbohydrates," *Advanced Functional Materials*, 15, 2710-2716, 2007.
8. M. Chen, T. Pica, Y-B. Jiang, P. Li, K. Yano, J. P. Liu, A. K. Datye, and H. Fan, "Synthesis and self-assembly of fcc phase FePt Nanorods," *Journal of the American Chemical Society*, 129 (20), 6348-6349, 2007.
9. H. Fan, C. Hartshorn, T. Buchheit, D. Tallant, R. Assink, R. Simpson, D. Kissel, D. J. Lacks, S. Torquato, and C. J. Brinker, "Modulus-density scaling behaviour and framework architecture of nanoporous self-assembled silicas," *Nature Materials*, 6, 418-423, 2007.
10. Z. Yuan, B. Burckel, P. Atanassov, and H. Fan, "Convective self-assembly to synthesize supported ultra-thin mesoporous silica films," *Journal of Materials Chemistry*, 16 (48), 4637-4641, 2006. (**Featured on Journal Cover**)
11. M. Chen, J. Kim, J. P. Liu, H. Fan, and S. Sun, "Synthesis of FePt nanocubes and their oriented self-assembly," *Journal of the American Chemical Society*, 128 (22), 7132 -7133, 2006.

12. A. T. Rodriguez, M. Chen, and Z. Chen, C. J. Brinker, and H. Fan, "Nanoporous carbon nanotubes synthesized through confined hydrogen bonding self-assembly," *Journal of the American Chemical Society*, 128 (29), 9276-9277, 2006.
13. A. Wright, J. Gabaldon, B. Burckel, Y-B. Jiang, Z. R. Tian, J. Liu, C. J. Brinker, and H. Fan, "Hierarchical ordered mesophase crystals formed through hydrothermal self-assembly of nanocrystal-micelles and silsesquioxane," *Chemistry of Materials*, 18(13), 3034-3038, 2006. **(Featured on Journal Cover for consecutive 5 issues from September to October 2006)**
14. H. K. Baca, C. Ashley, E. Carnes, D. Lopez, J. Flemming, D. Dunphy, S. Singh, Z. Chen, N. Liu, H. Fan, G. P. Lopez, S. M. Brozik, M. Werner-Washburne, and C. J. Brinker, "Cell-directed assembly of the bio-nano interface," *Science*, 313 (no. 5785), 337-341, 2006. **(Featured on Chemical & Engineering News 2006)**
15. H. Fan, J. Gabaldon, C. J. Brinker, and Y-B. Jiang, "Ordered nanocrystal/silica particles self-assembled from nanocrystal micelles and silicate," *Chemical Communications*, 22, 2323-2325, 2006. **(Featured on Journal Cover)**
16. H. Fan, A., Wright, J. Gabaldon, A. Rodriguez, J. Brinker, and Y-B. Jiang, "3-Dimensionally ordered gold nanocrystal/silica superlattice thin films synthesized via sol-gel self-assembly," *Advanced Functional Materials*, vol. 16, 891-895, 2006. **(Featured on Journal Cover)**
17. H. Fan, Z. Chen, C. J. Brinker, J. Clawson, and T. Alam, "Synthesis of organo-silane functionalized nanocrystal micelles and their self-assembly," *Journal of the American Chemical Society*, vol.127, 13746-13747, 2005.
18. H. Fan, E. Leve, J. Gabaldon, A. Wright, R. E. Haddad, C. J. Brinker, "Ordered two- and three-dimensional arrays self-assembled from water-soluble nanocrystal-micelles," *Advanced Materials*, vol.17, 2587-2590, 2005.
19. K. Yang, H. Fan, K. J. Malloy, C. J. Brinker, and T. W. Sigmon, "Electrical and optical properties of self-assembled, ordered gold nanocrystal/silica thin films prepared by sol-gel processing", *Mater. Res. Soc. Symp. Proc.*, vol. 872, 103-108, 2005.
20. H. Fan, E. W. Leve, C. Scullin, D. Tallant, M. C. Wilson, C. J. Brinker, "Surfactant-assisted synthesis of water-soluble and biocompatible quantum dot micelles for bioapplications," *Proc. SPIE*, Vol. 5705, 92-100, 2005.
21. K. Yang, H. Fan, K. J. Malloy, C. J. Brinker, and T. W. Sigmon, "Optical and electrical properties of self-assembled, ordered gold nanocrystal/silica thin films prepared by sol-gel processing," *Thin Solid Film*, vol. 491, 38-42, 2005.

22. H. Fan, E. W. Leve, C. Scullin, J. Gabaldon, D. Tallant, S. Bunge, T. Boyle, M. C. Wilson, and C. J. Brinker, "Surfactant-assisted synthesis of water-soluble and biocompatible quantum dot micelles," *Nano Letters*, vol. 5, 645-648, 2005. **(One of the most highly accessed articles)**
23. H. Fan, K. Yang, D. M. Boye, T. Sigmon, K. J. Malloy, H. Xu, and C. J. Brinker, "Self-assembly of ordered, robust, three-dimensional gold/silica nanocrystal arrays," *Science*, vol.304, 567-571, 2004.
24. H. Fan and C. J. Brinker, "Evaporation-induced self-assembly to functional nanostructure," *Studies in Surface Science and Catalysis*, vol. 48, 213-240, 2004.
25. T. M. Alam and H. Fan, "Investigation of templated mesoporous silicate materials using high speed, solid-state  $^1\text{H}$  MAS and double quantum NMR spectroscopy." *Macromolecular Chemistry and Physics*, vol. 204, No.16, 2023-2030, 2003.
26. B. Smarsly, K. Yu, G. Xomeritakis, R. A. Assink, C. Drewien, N. Liu, H. Fan, W. Ruland, C. J. Brinker, "Characterization of the microstructure of PS-*b*-PEO-templated silica films with a 3-D arrangement of spherical mesopores," *Langmuir*, 19 (18), 7295-7301, 2003.
27. T. J. Boyle, M. A. Rodriguez, D. Ingersoll, D. M. Pedrotty, S. C. Vick, S. D. Bunge. H. Fan, " Synthesis and characteization of a novel family of lithium cobalt double alkoxides and the characterization of the nanoparticle and thin films generated there from." *Chemistry of Materials* vol. 15, 3903-3912, 2003.
28. Y. Yang, Y. Lu, M. Lu, J. Huang, R. Haddad, G. Xomeritakis, N. Liu, A. P. Malanoski, D. Sturmayer, H. Fan, D. Y. Sasaki, R. A. Assink, J. A. Shelnut, F. van Swol, G. P. Lopez, A. R. Burns, and C. J. Brinker, "Functional nanocomposites prepared by self-assembly and polymerization of diacetylene surfactants and silicic acid." *Journal of the American Chemical Society*, vol. 125, 1269-1277, 2003.
29. H. Fan, H. R. Bentley, K. R. Kathan, P. Clem, Y. Lu, and C. J. Brinker, " Self-assembled aerogel-like low dielectric constant films," *Journal of Non-Crystal. Solids*, vol. 285 (#1-3) 79-83, 2001.
30. H. Fan, F. Van Swol, Y. Lu, and C. J. Brinker, "Multiphased assembly of nanoporous silica particles," *Journal of Non-Crystal. Solids*, vol. 285 (#1-3), 71-78, 2001.
31. H. Fan, S. T. Reed, T. Baer, R. Schunk, G. P. López, and C. J. Brinker, "Hierarchically structured functional porous and composite mesostructures produced by evaporation-driven self-assembly," *Microporous and Mesoporous Materials*, vol. 44-45, 625-637, 2001.
32. Y. Lu, Y. Yang, A. Sellinger, M. Lu, J. Huang, H. Fan, R. Haddad, G. P. López, A. R. Burns, D. Y. Sasaki, J. Shelnut, and C. J. Brinker, "Self-assembly of

- mesoscopically ordered chromatic polydiacetylene/silica nanocomposites,” *Nature*, vol. 410, 913-917, 2001.
33. H. Fan, Y. Lu, A. Stump, S. T. Reed, T. Baer, R. Schunk, V. Perez-Luna, G. P. López, and C. J. Brinker, “Rapid prototyping of patterned functional nanostructures,” *Nature*, vol. 405, 56-60, 2000.
  34. H. Fan, Y. Lu, R. A. Assink, G. P. López, and C. J. Brinker, “Surfactant templated mesoporous hybrid thin films,” *Mat. Res. Soc. Symp. Proc.*, vol. 628, CC6.41.1-CC6.41.7, 2000.
  35. H. Fan, D. D. Doshi, Y. Lu, G. P. López, and C. J. Brinker, “Patterned Functional Arrays by Selective De-Wetting,” *Mat. Res. Soc. Symp. Proc.*, vol. 628, CC6.33.1-CC6.33.6, 2000.
  36. H. Fan, G. P. López, and C. J. Brinker, “Rapid Prototyping of Patterned Multifunctional Nanostructures,” *Mat. Res. Soc. Symp. Proc.*, vol. 624, 231-240, 2003.
  37. D. Doshi, N. Huesing, M. Lu, H. Fan, Y. Lu, S. Potter K, Potter BG, A. A. Hurd, and C. J. Brinker, “Optically, defined multifunctional patterning of photosensitive thin-film silica mesophases.” *Science*, vol. 290, 107-111, 2000.
  38. Y. Lu, H. Fan, N. Doke, D. A. Loy, R. A. Assink, D. A. Lavan, and C. J. Brinker, “Evaporation-induced self-assembly of hybrid bridged silsesquioxane film and particulate mesophases with integral organic functionality,” *Journal of the American Chemical Society*, vol. 122, 5258-5261, 2000.
  39. T. Clark, Jr., J. D. Ruiz, H. Fan, C. J. Brinker, B. I. Swanson, and A. N. Parikh, “A new application of UV-ozone treatment in the preparation of substrate-supported mesoporous thin films.” *Chemistry of Materials* vol. 12, 3879-3884, 2000.
  40. Y. Lu, H. Fan, A. Stump, T. L. Ward, T. Rieker, and C. J. Brinker, “Aerosol-assisted self-assembly of mesostructured spherical nanoparticles,” *Nature* vol. 398, 223-226, 1999.
  41. C. J. Brinker, Y. Lu, A. Sellinger, and H. Fan, “Evaporation-induced self-assembly: nanostructures made easy,” *Advanced Materials*, vol. 11, No. 7, 579-585, 1999.
  42. D. Doshi, N. Huesing, H. Fan, A. A. Hurd, and C. J. Brinker, “Nanostructural lithography via photo-initiated phase transition of silica-surfactant assemblies,” *Mat. Res. Soc. Symp. Proc.*, vol. 576, 263-268, 1999.
  43. H. Fan and G. P. López, “Adsorption of surface-modified colloidal gold particles onto self-assembled monolayers: A model system for the study of interactions of colloidal particles and organic surfaces,” *Langmuir*, vol. 13(#2) 119-121, 1997.

44. H. Fan, Y. Zhou, and G. P. López, "Stepwise assembly in three dimensions: Preparation and characterization of layered gold nanoparticles in porous silica matrices," *Advanced Materials*, vol. 9 (9), 728-731, 1997.
45. Y. Zhou, H. Fan, T. Fong, and G. P. López, "Compositional-mapping of micropatterned, mixed self-assembled monolayers by lateral force microscopy," *Langmuir*, vol. 14 (3), 660-666, 1998.
46. L. K. Ista, H. Fan, O. Baca, and G. P. López, "Attachment of bacteria to model solid surfaces: Oligo(ethylene glycol) surfaces inhibit bacterial attachment," *FEMS Microbiology Letters*, vol. 142 (#1), 59-63, 1996. (ISI IF: 2.05, current citation: 33)
47. L. M. Tender, L. L. Worley, H. Fan, and G. P. López, "Electrochemical patterning of self-assembled monolayers onto microscopic arrays of gold electrodes fabricated by laser ablation," *Langmuir*, vol. 12 (#23) 5515-5518, 1996.
48. S. Lin, T. Rong, H. Wan, J. Bao, W. Wang, J. Sun, X. Jing, L. Wang, H. Fan, "Ion beam effects on polyaniline films," *Acta Polymerica Sinica*, vol. 1, 48-54, 1994.

**Two book Chapters:**

1. J. M. Oliver, J. R. Pfeiffer, Z. Surviladze, S. L. Steinberg, K. Leiderman, M. L. Sanders, C. Wofsy, J. Zhang, H. Fan, N. Andrews, S. Bunge, T. J. Boyle, P. Kotula, and B. S. Wilson, "Membrane Receptor Mapping: The Membrane Topography of FceRI Signaling," *Departments of Pathology1, Mathematics Subcellular Biochemistry 37: Membrane Dynamics and Domains*. Ed PJ Quinn, Kluwer Academic/Plenum Publishers, 2004.
2. H. Fan and C. J. Brinker, "Nanoparticle-micelle: a new building block for facile self-assembly and integration of 2-, 3-diemnsional functional nanostructures," *Annual Review of Nano Research*, vol 1. p153-184, World Scientific Publisher, 2006.

**PATENTS AND PATENT APPLICATIONS (15 patents and patent applications)**