

Curriculum Vitae

Xiao-An (Sean) Fu

Professor

Department of Chemical Engineering

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I. EDUCATION

- 2001 Ph.D. Chemical Engineering, Case Western Reserve University, Ohio, USA
1989 M.S. Chemical Engineering, Institute of Process Engineering
Chinese Academy of Sciences, Beijing, P.R. China
1986 B.S. Chemical Engineering, Nanchang University, Jiangxi, P. R. China

II. PROFESSIONAL APPOINTMENTS

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|---------------------------|------------------------|--|
| July 2019 –Present | Professor, | Department of Chemical Eng.,
University of Louisville |
| July 2014 – June 2019, | Associate Professor, | Department of Chemical Eng.,
University of Louisville |
| August 2008 – June 2014, | Assistant Professor, | Department of Chemical Eng.,
University of Louisville |
| August 2007 – July 2008, | Researcher, | Department of Electrical Eng.
Case Western Reserve University |
| August 2004 – July 2007, | Senior Res. Associate, | Department of Electrical Eng.,
Case Western Reserve University. |
| October 2001 – July 2004, | Research Associate, | Department of Electrical Eng.,
Case Western Reserve University |
| June 1997 – August 2001, | Research Assistant, | Department of Chemical Eng.,
Case Western Reserve University |
| March 1996 – May 1997, | Visiting Res. Scholar, | Department of Chemical Eng.,
Case Western Reserve University |
| Aug.1989 – March 1996, | Assistant Researcher, | Institute of Photographic Chemistry,
Chinese Academy of Sciences, PRC |

III. HONORS and AWARDS

- 2017 US patent 9,638,695, Noninvasive detection of lung cancer using exhaled breath.
2014 US patent 8,663,581, Preconcentrator and method of using the same.
2012 Bill and Melinda Gates Foundation Tuberculosis Biomarker Research Award.
2007 US patent 7,261,919, Silicon carbide and other films and method of deposition.
2001 Chinese patent ZL96101115.7, Water-based ternary mixed fuel composition of coal and water and oil.
1996 Visiting Scholarship Award from the Chinese Academy of Sciences.
1994 Young Researcher Award for Excellent Research Presentation, the Institute of Photographic Chemistry, Chinese Academy of Sciences, Beijing, P.R China.
1993 ICSC–World Laboratory Travel Award for attending the 18th International Conference on Coal Utilization and Fuel Systems, Clearwater, Florida, USA.

IV. PROFESSIONAL AFFILIATIONS

The American Institute of Chemical Engineers (AIChE)
The Institute of Electrical and Electronics Engineers (IEEE)
The American Chemical Society (ACS)

V. PROFESSIONAL ACTIVITIES

2022 NIH Tobacco Regulatory Science Study Section, Center for Scientific Review Special Emphasis Panel, May 2022.
2022 NIH Instrumentation and Systems Development (ISD) Study Section, Bioengineering Sciences and Technologies IRG, February 2022.
2022 NSF review panel, January 2022.
2021 NIH Instrumentation and Systems Development (ISD) Study Section, Bioengineering Sciences and Technologies IRG, June 2021.
2021 Review of one proposal for Mitas Canada, August 2021.
2019 Review of one proposal for the New Zealand Marsden Funds, July 2019.
2018 Review of one proposal for the National Science and Engineering Research Council of Canada, May 2018.
2017 Review Panelist, NSF Division of CBET, MRI program, March 2017.
2016 Review Panelist, NSF Division of CBET, BioNanoSensing program, February 2016.
2016 Review of one proposal for the Dutch Heart Foundation, February 2016.
2016 Review of Abstracts for 2016 IEEE Sensor conference, USA.
2015 Chair of the Area of Electronic and Photonic Materials of Material Engineering and Science Division (MESD); 2015 AIChE Annual Meeting.
2015 NSF Graduate Fellowship Review Panelist, January 2015.
2015 Review of one proposal for Austrian Science Fund, May 2015.
2014 Review one proposal for NSF Chemistry program, March 2014.
2014 Faculty Search Committee, Department of Chemical Engineering, UofL
2014 Technical Program Committee, A solid state sensors, actuators and microsystems workshop 2014, Hilton Head, SC.
2014 Area Co-Chair of Electronic and Photonic Materials, Material Engineering and Science Division; 2014 AIChE Annual Meeting.
2013 Chair of Nanoelectronic Materials Session; Co-Chair of Bioelectronics and Sensors Session, Materials Engineering and Sciences Division (MESD); 2013 AIChE Annual Meeting.
2012 Review Panelist, NSF Division of CBET, Chemical & Biological Separation Program, March 2012.
2012 Technical Program Committee, 2012 Hilton Head Solid State Sensors, Actuators & Microsystems Workshop, June 2012.
2011 Review Panelist, NSF Division of CBET, Chemical & Biological Separation Program, March 2011.
2011 DoD Graduate Fellowship Review Panelist, February 2011.
2010 Reviewer for NSF DMR Electronic and Photonic Materials Program, March 2010.
2010 NSF Graduate Fellowship Review Panelist, February 2010.

- 2009 Review Panelist, NSF Division of ECCS, EPMD program, February 2009.
2009 Chair of Electronic Materials Session, Materials Engineering and Sciences Division at AIChE Annual Meeting.
2008 Judge of undergraduate student research poster competition at AIChE annual meeting.

Review of manuscripts for 15 journals (2008-present)

IEEE Journal of Microelectromechanical Systems (JMEMS);
Journal of Micromechanics and Microengineering (JMM);
IEEE Sensor Journal;
IEEE Transaction on Electronic Devices (TED);
Sensors and Actuators A;
Sensors and Actuators B;
Journal of Material Chemistry C;
Journal of Electrochemical Society;
Nanotechnology;
Analytical Chemistry;
Analyst;
Journal of Physical Chemistry;
Langmuir;
Journal of Breath Research;
ACS Omega. ACS Sensors

VI. TEACHING

- Graduate courses: CHE 686 Chemical Engineering Analysis;
CHE 694 Chemical and Biological Microsystems
Undergraduate courses: CHE 461 Chemical Engineering Process Control
CHE 312 Chemical Engineering Thermodynamics II;
CHE 253 Materials Science.
New course developed: CHE 694 Chemical and Biological Microsystems

VII. PUBLICATIONS

REFERRED JOURNALS

1. S. Halder, Z. Xie, M. Nantz, X.A. Fu, Integration of a micropreconcentrator with solid-phase microextraction for analysis of trace volatile organic compounds by gas chromatography-mass spectrometry, *Journal of Chromatography A* 2022, 1673, 463083.
2. A. Shaffie, A. Soliman, X.A. Fu, M. Nantz, G. Giridharan, V. van Berkel, A. Almaghraby, A. Al-baz, A novel technology to integrate image and clinical markers for noninvasive diagnosis of lung cancer, *Scientific Report* 2021, 11:4597.
3. Q. Li, X.A. Fu, K. Xu, H. He, N. Jiang, A stability study of carbonyl compounds in Tedlar bags by a fabricated MEMS microreactor approach, *Microchemical Journal* 2021,160:105611.

4. Z. Xie, M. Raju, P. Adhihetty, X.A. Fu, M.H. Nantz, Effect of thiol molecular structure on the sensitivity of gold nanoparticle-based chemiresistors toward carbonyl compounds, *Sensors* 2020, 20:7024.
5. T. Ando, X.A. Fu, "Materials: silicon and beyond" *Sensors and Actuators A* 296, 340-351, 2019.
6. M. Ogunwale, L. Thompson, M. H. Nantz, X. A. Fu, "The Influence of β -Ammonium Substitution on the Reaction Kinetics of Aminooxy Condensations with Aldehydes and Ketones" *ChemPhysChem* 20, 815-822, 2019.
7. Y. Chen, Q. Li, Z. Xie, X.A. Fu, "High capture efficiencies of carbonyls via a single DNPH-coated microreactor chip" *J. Chromatography B*. 1106-1107, 58-63, 2019.
8. Z. Xie, M.V.Raju, A. C. Stewart, M. H. Nantz, X. A. Fu, "Imparting Sensitivity and Selectivity to a Gold Nanoparticle Chemiresistor Through Thiol Monolayer Functionalization" *RSC Advances* 8, 35618-35624, 2018.
9. D. Conklin, M. Ogunwale, Y. Chen, W.S. Theis, M.H. Nantz, X.A. Fu, L.C. Chen, D.W. Riggs, P. Lorkiewicz, A. Bhatnagar, S. Srivastava, "Electronic cigarette-generated aldehydes: The contribution of e-liquid components to their formation and the use of urinary aldehyde metabolites as biomarkers of exposure" *Aerosol Sci. Tech.* 52, 1219-1232, 2018.
10. M. Li, Q. Li, M. H. Nantz, X.A. Fu "Analysis of carbonyl compounds in ambient air by a microreactor approach" *ACS Omega* 3, 6764-6769, 2018.
11. M. Ogunwale, M.X. Li, M.R. Raju, Y. Chen, M.H., Nantz, D. Conklin, X.A. Fu "Aldehyde detection in electronic cigarette aerosols" *ACS Omega* 2, 1207-1214, 2017.
12. M. Ogunwale, Y. Chen, W. Theis, M.H., Nantz, D. Conklin, X.A. Fu, "A novel method of nicotine quantification in electronic cigarette liquids and aerosols" *Analytical Methods* 9, 4261-4266, 2017.
13. U. Sagaeva, R. Zhao, S. Mushinsky, J. Jasinski, X.A. Fu, V. Henner, R. Dharmasena, G. Sumanasekera, "Photoluminescence in functionalized/doped graphene quantum dots, role of surface states" *J. Nanomaterials Molecular Nanotechnology* 6, 2, 2017.
14. E. Schumer, M. Black, M. Bousamra, M. Li, X.A. Fu, V. van Berkel, "Normalization of exhaled carbonyl compounds after lung cancer resection" *Ann Thorac Surg* 102, 1095-1100, 2016.
15. E. Schumer, J.R. Trivedi, V. van Berkel, M.C. Black, M. Li, X.A. Fu, M. Bousamra, "High sensitivity for lung cancer detection using analysis of exhaled carbonyl compounds" *J. Thoracic Cardiovascular Surgery* 150, 1517-1523, 2015.
16. R.J. Knipp, M.X.Li, X.A. Fu, M.H. Nantz, "A versatile probe for chemoselective capture and analysis of carbonyl compounds in exhaled breath" *Analytical Methods* 7, 6027-6035, 2015.
17. M.X.Li, D. Yang, G. Brock, R.J. Knipp, M. Bousamra, M.H. Nantz, X.A. Fu, "Breath carbonyl compounds as biomarkers of lung cancer", *Lung Cancer* 90, 92-97, 2015.
18. M. Bousamra, E. Schumer, M. Li, R.J. Knipp, M.H. Nantz, V. van Berkel, X.A. Fu, "Quantitative analysis of exhaled carbonyl compounds distinguishes benign from malignant pulmonary disease" *J. Thoracic Cardiovascular Surgery* 148, 1074-1081, 2014.
19. X. A. Fu, M. Li, R. J. Knipp, M. H. Nantz, M. Bousamra, "Noninvasive Detection of Lung Cancer Using Exhaled Breath". *Cancer Medicine* 3, 174-181, 2014.

20. X.A. Fu, J. Trevino, M. Mehregany, C.A. Zorman, "Doped polycrystalline 3C-SiC films with low stress for MEMS: Part I. Deposition conditions and film properties" *J. Micromech. Microeng.* 24, 035013 (7pp), 2014.
21. J. Trevino, X.A. Fu, M. Mehregany, C.A. Zorman, "Doped polycrystalline 3C-SiC films with low stress for MEMS: Part II. Characterization using micromachined structures" *J. Micromech. Microeng.* 24, 065001 (8pp), 2014.
22. C.W. Soong, S.L. Garverick, X.A. Fu, A. C. Patil, M. Mehregany, "A fully monolithic 6H-SiC JFET-based transimpedance amplifier for high-temperature capacitive sensing" *IEEE Transactions Electron Devices*, 60, 4146-4151, 2013.
23. M. Li, S. Biswas, M.H. Nantz, R.M. Higashi, X.A. Fu, "A microfabricated preconcentration device for breath analysis" *Sensors & Actuators B* 180, 130-136, 2013.
24. K. Miller, M. Li, K.M. Walsh, X.A. Fu, "The effects of DRIE operational parameters on vertically aligned micropillar arrays" *J. Micromech. Microeng.* 23, 035039, 2013.
25. C.W. Soong, A. C. Patil, S.L. Garverick, X.A. Fu, M. Mehregany, "550 °C Integrated Logic Circuits using 6H-SiC JFETs" *IEEE Electron Device Lett.*, 33, 1369-1371, 2012.
26. M. Li, S. Biswas, M.H. Nantz, R. M. Higashi, X.A. Fu, "Preconcentration and Analysis of Trace Volatile Carbonyl Compounds" *Analytical Chemistry*, 84, 1288-1293, 2012.
27. X.A. Fu, M. Li, S. Biswas, M. H. Nantz, R. M. Higashi, "A novel microreactor approach for analysis of ketones and aldehydes in breath" *Analyst*, 136, 4662-4666, 2011.
28. X.A. Fu, K. Onkino, M. Mehregany, "Thermal oxidation of silicon carbide: A comparison of n-type and p-type doped epitaxial layers" *Applied Physics Letters*, 98, 042106, 2011.
29. X.A. Fu, J. Dunning, M. Mehregany, C. A. Zorman, "Low stress polycrystalline SiC thin films suitable for MEMS applications" *J. Electrochem. Soc.* 158, H675-H680, 2011.
30. X.A. Fu, A.C. Patil, T. H. Lee, S. Garverick, M. Mehregany, "Fabrication of SiC JFET-based monolithic integrated circuits" *Materials Science Forum*, Vol.645-648, pp1115-1118, 2010.
31. A.C. Patil, X.A. Fu, M. Mehregany, S. Garverick "Fully-integrated 6H-SiC JFET amplifiers for high-temperature sensing monolithic" *Materials Science Forum*, Vol.645-648, pp1107-1110, 2010.
32. A.C. Patil, X.A. Fu, C. Anupongongarch, M. Mehregany, S. L. Garverick, "6H-SiC JFETs for 450 °C differential sensing applications" *J. Microelectromechanical Systems (J MEMS)*, vol. 18, 950-961, 2009.
33. X.A. Fu, A.C. Patil, M. Mehregany, S. Garverick "6H SiC lateral JFETs for analog integrated circuits" *Materials Science Forum*, Vol.600, pp1099-1102, 2009.
34. A.C. Patil, X.A. Fu, M. Mehregany, S. Garverick, "Silicon carbide differential amplifiers for high-temperature sensing" *Materials Science Forum*, Vol.600, pp1083-1086, 2009.
35. X.A. Fu, S. Noh, L. Chen, M. Mehregany, "Very thin poly-SiC films for micro/nano devices" *J. Nanoscience and Nanotechnology*, vol. 8, 3063-3067, 2008.
36. S. Noh, X.A. Fu, L. Chen, M. Mehregany, "A study of electrical properties and microstructure of nitrogen-doped poly-SiC films deposited by LPCVD" *Sensors and Actuators A-Physical*, vol. 136, 613-617, 2007.
37. R.G. Azevedo, D.G. Jones, A.V. Jog, B. Jamshidi, D.R. Myers, L. Chen, X.A. Fu, M. Mehregany, M. B. J. Wijesundara, A.P. Pisano, "A SiC MEMS resonant strain sensor for harsh environment applications" *IEEE Sensor Journal*, vol. 7, 568-576, 2007.

38. S. Noh, X.A. Fu, L Chen, M. Mehregany, "Deposition and properties of polycrystalline β -SiC films using LPCVD with different dopant amount" *Electronics Letters*, vol. 42, 776-777, 2006.
39. S. Noh, E.A. Lee, X. A. Fu, C. Li, M. Mehregany, "Characterization of polycrystalline β -SiC films deposited by LPCVD with different doping concentration" *Transactions on Electrical and Electronic Materials* 6(6), 245-248, 2005.
40. X.A. Fu, J. Dunning, C.A. Zorman, M. Mehregany, "Polycrystalline 3C-SiC thin films grown by LPCVD using dual precursors" *Sensors and Actuators*, vol. 119, 169-176, 2005.
41. X.A. Fu, J. Dunning, C.A. Zorman, M. Mehregany, "Residual stress and Young's modulus of polycrystalline 3C-SiC films grown by LPCVD" *Thin Solid Films*, vol. 492, 195-202, 2005.
42. X.A. Fu, S. Qutubuddin, "Swelling behavior in styrene and exfoliation in nanocomposites" *J. Colloid and Interface Sic.* 283, 373-379, 2005.
43. X.A. Fu, R. Jezeski, C.A. Zorman, M. Mehregany, "The use of deposition pressure to control residual stresses in polycrystalline SiC films" *Applied Physics Letter*, 84, 341-343, 2004.
44. X.A. Fu, J. Dunning, C. A. Zorman, M. Mehregany, "Surface roughness control of 3C-SiC films during the epitaxial growth process" *J. Electrochem. Society* 151, G910-914, 2004.
45. X.A. Fu, S. Qutubuddin, "Synthesis and characterization of unsaturated polyester-clay nanocomposites" *Polymer Eng. Sci.* vol. 44 (2), 345-351, 2004.
46. X. A. Fu, C. A. Zorman, M. Mehregany, "Chemical-mechanical polishing of cubic silicon carbide films grown on Si (100) wafers" *J. Electrochem. Soc.* vol. 149, G643-649, 2002.
47. C. A. Zorman, S. Rajgopal, X. A. Fu, Jezeski, R.; Melzak, J.; Mehregany M. "Deposition of polycrystalline 3C-SiC films on 100 mm diameter Si (100) wafers in a large -volume LPCVD furnace" *Electrochemical Solid State Lett.* 5, G99-101, 2002.
48. X. A. Fu, S. Qutubuddin, "Polymerization of styrene and polymerizable cationic surfactant in three-component microemulsion" *Langmuir* 18, 5058-5063, 2002.
49. S. Qutubuddin, X. A. Fu, Y. Tajuddin, "Synthesis polystyrene-clay nanocomposite via emulsion polymerization using a reactive surfactant" *Polymer Bull.* 48, 143, 2002.
50. X. A. Fu, S. Qutubuddin, "Preparation and characterization of titania nanocoatings on monodisperse silica particles" *Colloid & Surfaces* 178, 151, 2001.
51. X. A. Fu, S. Qutubuddin, "Synthesis of titania-coated silica nanoparticles using a nonionic water-in-oil microemulsion" *Colloid & Surfaces* 179, 65, 2001.
52. X. Fu, S. Qutubuddin, "Polymer-clay nanocomposites: exfoliation of organophilic montmorillonite nanolayers in polystyrene" *Polymer* vol. 42, 807-813, 2001.
53. X. A. Fu, S. Qutubuddin, "Synthesis of Polystyrene-clay nanocomposites", *Mater. Lett.*, 42, 12-15, 2000.
54. D. Guo, X. A. Fu, J. Tang, L. Jiang, "Preparation and rheological properties of heavy oil-coal-water triple synfuel" *Fuel* vol. 76, 893, 1997.
55. X. A. Fu, D. Guo, J. Tang, L. Jiang, "A low viscosity synfuel composed of light oil-coal-water" *Fuel* vol.75, 1629, 1996.
56. X. A. Fu, X. J. Hu, X. L. Ye, L. Jiang, "Improvement of the properties of a functional organized thin film by the introduction of nanoparticles--Part I. Retardation of

- photoisomerization rate of a spiropyran-containing Langmuir-Blodgett film by the incorporation of SiO₂ nanoparticles” *Colloids & Surfaces* vol. 117, 95, 1996.
57. X. A. Fu, Y. C. Song, S. B. Huang, L. Zhang, L. Jiang, “Influence of surface treatment by pitch on the beneficiation of high water content coal and rheological properties of coal water slurry” *Fuel* vol. 73, 1772, 1994.
 58. W. Wang, X. A. Fu, J. Tang, L. Jiang, “Preparation of submicron spherical SiO₂ particles by w/o microemulsion method” *Colloids & Surfaces* vol. 81, 177, 1993.
 59. X. A. Fu, Z. L. Wang, “Pressure Drop and relative velocity of gas-particle suspended flow in standpipe” *Petroleum Processing (Chinese)* vol. 1, 54, 1990.

PUBLICATIONS IN REFERRED PROCEEDINGS

60. Q. Li, Z. Xie, M. Nantz, X.A. Fu, The effect of microreactor structure on quantitative analysis of trace volatile organic compounds, The 23rd International Conference on Miniaturized Systems of Chemistry and Life Science (MicroTAS), Basel, Switzerland, October 2019.
61. Z. Xie, Q. Li, T. Sibakoti, M. Nantz, V. van Berkel, X.A. Fu, Detection of lung cancer by breath analysis with chemoselective microreactors, The 71st American Association for Clinical Chemistry Annual Scientific Meeting & Clinical Lab Expo, Anaheim, CA, August 2019.
62. Z. Xie, M.R. Raju, B. Brown, A.C. Stewart, M. H. Nantz, X. A. Fu, “Electronic nose for detection of toxic organic compounds in air” *Proceedings of the 19th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers17)*, Kaohsiung, Taiwan, pp. 1425 -1428, June 2017.
63. M. Li, S. Biswas, M. H. Nantz, R. M. Higashi, X. A. Fu, , “A Microfabricated Preconcentrating Device for Exhaled Breath Analysis” *Proceedings of the 16th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers11)*, , Beijing, P.R.China, pp. 1148-1151, June 2011.
64. A.C. Patil, X. A. Fu, M. Mehregany, S. L. Garverick, “Fully monolithic, 600 °C differential amplifier in 6H-SiC JFET IC technology,” *IEEE 2009 Custom Integrated Circuits Conference (CICC)*, San Jose, CA. pp.73-76, Sept. 13-16, 2009.
65. X.A. Fu, J. Dunning, C. A. Zorman, M. Mehregany, “Stress and Strain gradient control of poly-SiC”, *Proceedings of the 15th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers09)*, pp.1087-1090, June 2009.
66. S. Jin, X.A. Fu, M. Mehregany, “Ohmic contacts on n-type polycrystalline silicon carbide with Ti/TaSi₂/Pt”, *Proceedings of the 15th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers09)*, pp.1083-1086, June 2009.
67. T.H. Lee, K.M. Speer, X.A. Fu, S. Bhunia, “Polycrystalline silicon carbide NEMS for high temperature logic,” *Proceedings of the 15th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers09)*, pp. 900-903, June 2009.
68. A.C. Patil, X.A. Fu, C. Anupongongarch, M. Mehregany, S. Garverick, “Characterization silicon carbide differential amplifiers at high temperature”, *The 29th IEEE CSIC symposium*, pp.1-4, 2007.
69. X.A. Fu, J. Trevino, M. Mehregany, C. A. Zorman, “Nitrogen doped polycrystalline 3C-SiC films deposited by LPCVD for MEMS applications”, *The 14th International conference on solid state sensors, actuators and Microsystems (Tranducers07)*, pp. 509-512, June 2007.

70. X.A. Fu, J. Trevino, M. Mehregany, C. A. Zorman, "Nitrogen-doping of polycrystalline 3C-SiC films deposited by low pressure chemical vapor deposition", *Mater. Sci. Forum*, vol. 527-529, pp311-315, 2006.
71. L. Chen, X.A. Fu, C. A. Zorman, M. Mehregany, "Novel polycrystalline SiC films containing nanoscale through-pores by selective APCVD", *Mater. Sci. Forum*, vol. 527-529, pp. 755-759, 2006.
72. J. Dunning, X.A. Fu, M. Mehregany, C. A. Zorman, "Characterization of low stress, undoped LPCVD polycrystalline SiC films for MEMS applications", *Mater. Sci. Forum*, vol. 527-529, pp. 1103-1107, 2006.
73. R. Panday, X. A. Fu, S. Rajgopal, T. Lisby, S. A. Nikles, K. Najafi, M. Mehregany, "Mechanical testing of flexible silicon carbide interconnect ribbons", *Mater. Sci. Forum*, vol. 527-529, pp. 1107-1111, 2006.
74. J. Trevino, X.A. Fu, M. Mehregany, C. A. Zorman, "Low stress, heavily-doped polycrystalline silicon carbide for MEMS applications", in *MEMS 2005 Miami Technical Digest*, pp451-454, Miami Beach, Florida, USA 2005.
75. X.A. Fu, J. Dunning, S. Rajgopal, M. Zhang, C. A. Zorman, M. Mehregany, "Mechanical properties and morphology of polycrystalline 3C-SiC films deposited on Si and SiO₂ by LPCVD" in *Mat. Res. Soc. Symp. Proc.*, vol. 795, pp. U11.3.1-11.3.6. 2004.
76. L. Chen, X.A. Fu, C. A. Zorman, M. Mehregany, "Fabrication of micro- and nanoscale SiC structures using selective deposition processes", *Mat. Res. Soc. Symp. Proc.*, vol. 782, pp. A2.2.1-2.2.6. 2004.
77. X.A. Fu, J. Dunning, C. A. Zorman, M. Mehregany, "Development of a high-throughput LPCVD process for depositing low stress Poly-SiC", *Mater. Sci. Forum*, 457-460, 305-308 Part 1&2, 2004.
78. J. Dunning, X.A. Fu, S.Rajgopal, M. Mehregany, C.A. Zorman, "Characterization of polycrystalline SiC thin films for MEMS applications using surface micromachined devices", *Mater. Sci. Forum*, 457-460, 1523-1526 Part 1&2, 2004.
79. X.A. Fu, J. Dunning, C. A. Zorman, M. Mehregany, "Young's modulus and residual stress of polycrystalline 3C-SiC films grown by LPCVD and measured by the load-deflection technique", *Mater. Sci. Forum*, 457-460, 1519-1522 Part 1&2, 2004.
80. X.A. Fu, S. Qutubuddin, "Functionalized clay for polymer nanocomposites", in *Proceedings of SAMPE-ACCE-DOE Advanced Materials Conference*, 152-159, Detroit, Michigan, September 1999.
81. X.A. Fu, D. Guo, L. Jiang, "A new kind of fuel composed of water/coal/hydrocarbon", in *Proceedings of the 21st International Technical Conference on Coal Utilization & Fuel Systems*, 259-266, 1996.
82. Z.X. Zang, L. Zhang, X. A. Fu, L. Jiang, "Additive for coal water slurry made from weak slurryability coal", in the *Proceedings of the 18th International Technical Conference on Coal Utilization & Fuel Systems*, 821-828, 1993.
83. Z. Xie, Q. Li, M. Zantz, X.A. Fu, Analysis of carbonyls in exhaled breath of smokers and nonsmokers by a microreactor approach, Kentucky Nano-Additive Manufacture Symposium, Louisville, KY, July 2019.
84. S. Helder, Z. Xie, P. Adhietty, M. Zantz, X.A. Fu, Gas sensor array for detecting acetone by using functionalized alkylurea thiol gold nanoparticles, Kentucky Nano-Additive Manufacture Symposium, Louisville, KY, July 2019.

CONFERENCE ABSTRACTS AND PRESENTATIONS

85. Sujoy Halder, Zhenzhen Xie, Xiaoan Fu, "Detection of Benzene, Toluene, Ethylbenzene and Xylene in Environmental Air Using Micro-preconcentrator/Solid Phase Micro-Extraction/Gas Chromatography Mass Spectrometry", 2021 AIChE Annual Meeting in Boston, MA, Nov.7-12, 2021.
86. Z. Xie, J. D. Morris, M.H. Nantz, X.A. Fu, "Identification of Carbonyl Compounds in Exhaled Breath Using UHPLC-MS", 2021 AIChE Annual Meeting in Boston, MA, Nov.7-12, 2021.
87. J.D. Morris, Z. Xie, X.A. Fu, "Analysis of Wall Shear Stress and Fluid Flow on Microreactor," 2021 AIChE Annual Meeting in Boston, MA, Nov.7-12, 2021.
88. M. Ogunwale, X.A. Fu, M. H.Nantz, "2-hydrazinyl-N,N-trimethylethan-1-ammonium iodide: a reagent for chemoselective isolation of volatile aldehydes and ketones from exhaled breath" Oral presentation ANYL 468, the 253rd Annual Meeting of the ACS, San Francisco, CA, April 2017.
89. Q. Li, M. Li, M.H. Nantz, X.A. Fu, "Analysis of carbonyl compounds in exhaled breath for identification of lung cancer biomarkers" Oral presentation, 2017 AIChE Annual Meeting, Minneapolis, MN, October 2017.
90. Z. Xie, M.R. Raju, B. Brown, A.C. Stewart, M. H. Nantz, X. A. Fu, , "Electronic nose for detection of toxic organic compounds in air" 2017 AIChE Annual Meeting, Minneapolis, MN, October 2017.
91. X.A. Fu, M. Ogunwale, E. Hahnert, M. Nantz, D. Conklin, "Nicotine delivery from electronic cigarette devices" NIH Fall TCORS Grantee Meeting 2017, Bethesda, MD, October 2017.
92. Q. Li, M. Li, M.H. Nantz, X.A. Fu, "Modelling of Microreactors for Chemoselective Capture of Trace Volatile Organic Compounds" Oral presentation, 2016 AIChE Annual Meeting, San Francisco, CA, November 2016.
93. M. Ogunwale, M. Li, V.R. Mandapati, M. Nantz, D. Conklin, X.A. Fu, "Aldehyde detection in electronic cigarette aerosols" the 216 ACS Central Regional Meeting, Covington, KY, May 2016.
94. M. Ogunwale, Y. Chen, M. Nantz, D. Conklin, X.A. Fu, "Nicotine in electronic cigarette liquids and aerosols" NIH Fall TCORS Grantee Meeting 2016, Bethesda, MD, October 2016.
95. E. Schumer, M. Black, M. Bousamra, M. Li, X. A. Fu, V. van Berkel, "Normalization of exhaled carbonyl compounds after lung cancer resection" *the 52th annual meeting of the Society of Thoracic Surgeons (STS)*, Phoenix, Arizona, Jan. 23–Jan. 27, 2016.
96. E.Schumer, M.Li, V. van Berkel, X.A. Fu, M. Bousamra, "Lung cancer screening by quantitative analysis of exhaled carbonyl compounds" *Abstract of the 95th American Association of Thoracic Surgery (AATS) annual meeting*, Seattle, April 2015.
97. M. Li, Q. LI, M. Ogunwale, M.H. Nantz, X.A. Fu, "Characterization of Microreactors for capture of trace carbonyl compounds" Oral presentation, the 2015 *AIChE Annual Meeting*, Minneapolis, Salt Lake City, UT, November 2015.
98. Z. Xie, J. Stevens, X.A. Fu, "Detection of acetone in exhaled breath by gold nanoparticle gas sensors" the 2015 *AIChE Annual Meeting*, Minneapolis, Salt Lake City, UT, November 2015.

99. M. Bousamra, M. Li, R.J. Knipp, M.H. Nantz, X.A.Fu, "Detection of Early Lung Cancer Using Exhaled Breath" the 50th annual meeting of the Society of Thoracic Surgeons (STS), Orlando, Florida, Jan. 25-29, 2014.
100. M. Li, RT. Knapp, R. Higashi, M.H. Nantz, J. E. Graham, X.A. Fu, "Analysis of exhaled breath for diagnosis of Tuberculosis" Oral presentation, 2013 AIChE Annual Meeting, San Francisco, CA, November 2013.
101. K. Miller, K. M. Walsh, X.A. Fu, "Response surface analysis of the effect of DRIE process parameters on micro/nanopillar arrays" *AIChE Annual Meeting*, Pittsburgh, PA November 2012.
102. M. Li, S. Biswas, M. H. Nantz, R. M. Higashi, X. A. Fu, "A novel reactive chip for analysis of carbonyl compounds in exhaled breath" *AIChE Annual Meeting*, Pittsburgh, PA November 2012.
103. K.L. Gerfen, E. Holt, X.A. Fu "Detection of acetone in air using silver ion exchanged ZSM-5 and zinc oxide sensing films" *AIChE Annual Meeting*, Pittsburgh, PA November 2012.
104. K. Miller, K. M. Walsh, X.A. Fu, "Vertically aligned radial p-n junction silicon micro/nanopillar array solar cells" *AIChE Annual Meeting*, Minneapolis, MN, October 2011.
105. M. Li, S. Biswas, M. H. Nantz, R. M. Higashi, X. A. Fu, "A novel MEMS preconcentration approach for analysis of ketones and aldehydes in breath" *AIChE Annual Meeting*, Minneapolis, MN, October 2011.
106. N.C. Ng, X.A. Fu, "Synthesis and Comparison of Ceria Nanomaterials with Different Shape and Size" *AIChE Annual Meeting*, Minneapolis, Salt Lake City, UT, November 2010.
107. K. Miller X.A. Fu, "Thermal Analysis of SiC Microhotplates and Gas Sensors" *AIChE Annual Meeting*, Nashville, TN, November 2009.
108. X.A. Fu, K. Onkino, M. Mehregany, "Kinetics of Wet Thermal Oxidation of 6H Silicon Carbide" *AIChE Annual Meeting*, Nashville, TN, November 2009.
109. X.A. Fu, M. Mehregany, "Application of silicon carbide to RF MEMS" in IEEE-MTT-S international microwave symposium (IMS) 2007 workshop on Novel materials for RF MEMS, Hawaii, June 2007.
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111. X.A. Fu, S. Qutubuddin, "Polymerization of styrene and polymerizable cationic surfactant in three-component microemulsions" *AIChE Annual Meeting*, Reno, Nevada, November 2001.
112. X.A. Fu, P. Meneghetti, S. Qutubuddin, "Colloidal approach to polymer-clay nanocomposites" in *Particles 2001*, ACS, Florida, February 2001.
113. X.A. Fu, S. Qutubuddin, "Polymer-clay nanocomposites of phenolic and unsaturated polyester" *AIChE Annual Meeting*, Dallas, Texas, November 1999.
114. X.A. Fu, Qutubuddin, S. "Preparation and characterization of polystyrene-clay nanocomposites" *AIChE Annual Meeting*, Miami, Florida, November 1998.
115. X. A. Fu, S. Qutubuddin, "Preparation of pure and mixed inorganic nanoparticles using non-ionic microemulsions" *AIChE Annual Meeting*, Los Angeles, California, November 1997.

116. X.A. Fu, X. J. Hu, J. R. Li, X. L. Ye, L. Jiang, "Film forming ability of monodisperse silica nanoparticles and application" in *The 1994 China-Japan bilateral symposium on Langmuir—Blodgett films*, Jianan, China, pp.139-140, 1993.

INVITED PRESENTATIONS

1. X.A. Fu, "Analysis of metabolic VOCs in exhaled breath as biomarkers towards lung cancer research by high resolution mass spectrometry (HRMS)" Thermo-Fisher Annual Users' Meeting at the 65th ASMS conference, Indianapolis, IN, June 2017.
2. M. Bousamra, X.A. Fu, B. Freeman, "Lung cancer detection by breath analysis" *the 53rd annual meeting of the Society of Thoracic Surgeons (STS)*, Houston, Texas, January 2017.
3. X.A. Fu, "Micropreconcentrators and sensors for analysis of Trace volatile organic compounds (VOCs)" Seminar in the Department of Electrical Engineering and Computer Science at Case Western Reserve University, Cleveland, Ohio, September 2016.
4. X.A. Fu, M.H. Nantz, M. Bousamra, "Breath analysis for detection of lung cancer using silicon microreactor chips". ThermoFisher Scientific, Inc. San Jose, CA, August 4, 2015.
5. M. Bousamra, E. Schumer, M. Li, M. Nantz and X.A. Fu, "Quantitative Analysis of Exhaled Carbonyl Compounds Distinguishes Benign From Malignant Pulmonary Disease" *the 94th annual meeting of the American Association of Thoracic Surgery*, Toronto, Ontario, April 2014.
6. X. A. Fu, "A microreactor device approach for analysis of trace VOCs in exhaled breath", invited presentation in the Chemical & Biomolecular Engineering Department at Ohio State University, Columbus, OH, September 29, 2011.
7. X. A. Fu, "A Microreactor Device Approach for Analysis of Trace VOCs in Exhaled Breath", invited presentation in the Chemical Engineering Department, New Mexico State University, Las Cruces, NM, April 8, 2011.

BOOK CHAPTERS

1. C. A. Zorman, X. A. Fu, M. Mehregany, "Deposition Techniques for SiC MEMS" in *Silicon Carbide (SiC) Microelectromechanical Systems (MEMS) for Harsh Environment*, R. Cheung (editor). Imperial College Press, England, 2006.
2. S. Qutubuddin, X.A. Fu, "Polymer-clay nanocomposites: synthesis and properties" in *Nano-Surface Chemistry*, M. Rosoff (editor), Marcel Dekker, New York, 652 –673, 2002.
3. J. Tang, X.A. Fu, X. Chen, S. Huang, W. Liang, X. Li, , J. Yuan, L. Zhang, L. Jiang, "The preparation and rheological behaviors of high concentrated RMTS Mill Tailing Slurry" in *The Study of Gold Extraction* (Chinese), Academic Press, 193–200, 1992.

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2. X. A. Fu, R. M. Higashi, M. H. Nantz, "A preconcentrator and method of using the same" *US Patent No. 8,663,581*, 2014.
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3. A.S. El-Baz, A. Soliman, A. Shaffle, G.A. Giridharan, V. van Berkel, X.A. Fu, M. H. Nantz, "System and methods for detection of lung cancer" *US Provisional patent application, to be filed in September*, 2018.
4. X.A. Fu, M. H. Nantz, M. Bousamra, V. van Berkel, "Noninvasive detection of cancer originating in tissue outside of the lung using exhaled breath" *US Patent Application No. 16/044,753*, Filed July 2016.
5. X.A. Fu, M. H. Nantz, M. Bousamra, V. van Berkel, "Noninvasive detection of cancer originating in tissue outside of the lung using exhaled breath" World Intellectual Property Organization No. WO2017/023768 A1, Filed February 2017.
6. X.A. Fu, M. H. Nantz, M. Bousamra, V. van Berkel, "Noninvasive detection of cancer originating in tissue outside of the lung using exhaled breath" Chinese Patent Application No. 201680054759, Filed March 2018.
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8. M. Mehregany, C. A. Zorman, X. A. Fu, J. Dunning, "Silicon carbide and other films and method of deposition" US Patent No. 7,261,919, 2007.
9. X.A. Fu, D. H. Guo, L. Jiang, "Water-based ternary mixed fuel composition of coal and water and oil" Chinese Patent: ZL96101115.7, 2001, (CA No. 131:301336).