Dr. Xianhui "Andy" Zhao

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Education

• Ph.D., Agricultural, Biosystems and Mechanical Engineering **South Dakota State University, SD, USA 01/2013-12/2015**

Department of Agricultural and Biosystems Engineering

Advisors: Dr. Lin Wei and Dr. James Julson

Dissertation title: Develop hydrocarbon biofuel from non-food oilseeds through catalytic cracking pathways

• Master, Materials Science **Beijing Jiaotong University, Beijing, China 09/2010-07/2012**

Department of Mechanical and Electronic Control Engineering

Advisor: Dr. Changhong Li

Thesis title: The preparation and characterization of colored iron oxide glass thin films using sol-gel technique

• Bachelor, Mechanical Engineering **Heilongjiang University, Harbin, China 09/2006-07/2010**

Department of Electromechanical Engineering

Main Work and Internship Experience

• R&D Associate Staff **Oak Ridge National Laboratory, TN 06/2021-present**

Bioresource Science & Engineering Group (2021-present)

Manager: Dr. Erin Webb

Research focus: Biomass to composite • Biomass to energy • 3D printing • Nano-materials • Catalysts • Pyrolysis

• Postdoctoral Research Associate **Oak Ridge National Laboratory, TN 06/2018-05/2021**

Carbon & Composites Group (2018-2020), Advanced Composites Manufacturing Group (2020-2021)

Advisor: Dr. Soydan Ozcan

Research focus: Bio-fiber/polymer composite • 3D printing • Nano-materials • Catalysts • Pyrolysis • Waste to energy

• Postdoc Scholar **University of South Florida, FL 01/2016-04/2018**

Department of Chemical & Biomedical Engineering

Advisors: Dr. John Kuhn and Dr. Babu Joseph

Research focus: Biogas reforming • Fischer-Tropsch Synthesis • Powder/pellet catalysts • Aspen simulation • Process scale-up

• Graduate Research Assistant **South Dakota State University, SD 01/2013-12/2015**

Research focus: Biomass to energy • Vegetable oil extraction and upgrading • Catalysts • Design and assembling of reactors

• Research Assistant **Tsinghua University, China 08/2012-01/2013**

Department of Mechanical Engineering

Advisors: Dr. Gang Wang and Dr. Yiming Rong

Research focus: Material processing • Vacuum carburizing • Low-carbon alloy steel • Material characterization

• Research Intern **Institute of Chemistry, Chinese Academy of Sciences (CAS), China 02/2012-06/2012**

CAS Key Laboratory of Photochemistry

Advisor: Dr. Yuan Lin

Research focus: Solar cells • TiO_2 thin films • Hydrothermal method • Power conversion efficiency • Material characterization

Main Teaching Experience

Guest lecturer (Synthetic fuel production) University of South Florida, FL 03/2017

Guest lecturer (Chemical engineering thermodynamics) University of South Florida, FL 11/2016

Teaching Assistant (Engineering properties of biological materials) South Dakota State University, SD 08/2015-11/2015

Mentor 17 graduate and undergraduate students 01/2016-present

Grant Proposals

7. X. Bai, K. Vorst, R. Williams, K. Wang, B. Wahlen, **X. Zhao**, S. Ozcan, Y. Li. FY22 Bioenergy Technologies Office (BETO) Waste Feedstocks and Conversion R&D FOA; 2022; titled "Conversion of material recovery facilities (MRF) rejected wastes to value-added products for various material applications"; $2,250,000 (Awarded)
   My main contribution: discuss ideas, write biocomposite section, contact and find cost-share partner, calculate budget, review and revise proposal.
6. X. Yang, **X. Zhao**, J. Chen, Y. Pu, Y. Liu, A. Ragauskas, S. Ozcan, D. Weston, A. Salywon, K. Hultine. ORNL Director's R&D Fund; 2022; titled "Revolutionizing plant-based decarbonization using agave"; $500,000
   My main contribution: discuss ideas, write biochar production section, calculate budget, review and revise proposal.
5. O. Oyedeji, **X. Zhao**, E. Webb, T. Theiss. Sustainable ORNL Potential Showcase Projects; 2022; titled "Investigating the production of renewable natural gas from anaerobic digestion of solid waste to decarbonize ORNL steam boilers"; $150,000 (Awarded)
   My main contribution: discuss idea, calculate budget, draft and revise proposal.
4. E. Webb, J. Lacey, O. Oyedeji, **X. Zhao**, S. Ozcan. DOE Bioenergy Technologies Office FY22 Annual Operating Plan Full Application; 2021; titled "Value-added biocomposite production using off-spec biomass from mechanical fractionation"; $2,100,000 (Awarded)
   My main contribution: conduct previous research, discuss ideas, write Benchmarks, and revise proposal.
3. H. Tekinalp, S. Ozcan, **X. Zhao**, K. Li, S. Tan. U.S. Department of Energy Technology Commercialization Fund; 2019; titled "3D printing catalysts for improved efficiency and selectivity: converting waste to jet fuel"; $300,000 (Awarded)
   My main contribution: come up with idea, run experiments, contact and find partners, calculate budget, draft and revise commitment letter/proposal eligibility declaration/abstract/royalty cost share pre-proposal/full proposal.
2. S. Ozcan, **X. Zhao**, K. Li. Oak Ridge National Laboratory Center for Nanophase Materials Sciences Research proposal; 2021; titled "Smart polylactic acid: On demand mechanical properties" (Approved)
   My main contribution: draft and revise proposal.
1. G. Larsen, S. Ozcan, H. Tekinalp, K. Li, M. Lamm, **X. Zhao**, S. Pingali, L. Petridis, S. Liu. Oak Ridge National Laboratory Neutron Sciences User Office proposal; 2020; titled "Structural change of spray-dried cellulose nanofibrils with varying processing conditions" (Approved)
   My main contribution: prepare samples for neutron scattering measurement, discuss experimental results, discuss proposal writing, and revise proposal.

Peer-review Papers

53. **X. Zhao**, M. Korey, K. Li, K. Copenhaver, H. Tekinalp, S. Celik, K. Kalaitzidou, R. Ruan, A. Ragauskas, S. Ozcan. Plastic waste upcycling toward a circular economy. Chemical Engineering Journal. 428: 131928, 2022.
52. **X. Zhao**, K. Copenhaver, L. Wang, M. Korey, D. Gardner, K. Li, M. Lamm, V. Kishore, S. Bhagia, M. Tajvidi, H. Tekinalp, O. Oyedeji, S. Wasti, E. Webb, A. Ragauskas, H. Zhu, W. Peter, S. Ozcan. Recycling of natural fiber composites: Challenges and opportunities. Resources, Conservation & Recycling. 177: 105962, 2022.
51. **X. Zhao**, K. Li, Y. Wang, H. Tekinalp, A. Richard, E. Webb, S. Ozcan. Bio-treatment of poplar via amino acid for interface control in biocomposites. Composites Part B: Engineering. 199: 108276, 2020.
50. **X. Zhao**, K Li, Y. Wang, H. Tekinalp, G. Larsen, D. Rasmussen, R. Ginder, L. Wang, D. Gardner, M. Tajvidi, E. Webb, S. Ozcan. High-strength polylactic acid (PLA) biocomposites reinforced by epoxy-modified pine fibers. ACS Sustainable Chemistry & Engineering. 8 (35): 13236-13247, 2020.
49. **X. Zhao**, B. Joseph, J. Kuhn, S. Ozcan. Biogas reforming to syngas: a review. iScience. 23 (5): 101082, 2020.

48. **X. Zhao**, A. Naqi, D. Walker, T. Roberge, M. Kastelic, B. Joseph, J. Kuhn. Conversion of landfill gas to liquid fuels through a TriFTS (tri-reforming and Fischer-Tropsch Synthesis) process: a feasibility study. Sustainable Energy & Fuels. 3 (2): 539-549, 2019.
47. **X. Zhao**, H. Tekinalp, X. Meng, D. Ker, B. Benson, Y. Pu, A. Ragauskas, Y. Wang, K. Li, E. Webb, D. Gardner, J. Anderson, S. Ozcan. Poplar as biofiber reinforcement in composites for large-scale 3D printing. ACS Applied Bio Materials. 2 (10): 4557-4570, 2019.
46. **X. Zhao**, P. Stachurski, S. Shah, D. Maiti, S. Ramani, A. Wright, D. Walker, B. Joseph, J. Kuhn. Design and optimization of NiMg/ceria-zirconia catalyst pellets. Powder Technology. 357: 214-222, 2019.
45. **X. Zhao**, D. Walker, D. Maiti, A. Petrov, M. Kastelic, B. Joseph, J. Kuhn. NiMg/ceria-zirconia cylindrical pellet catalysts for tri-reforming of surrogate biogas. Industrial & Engineering Chemistry Research. 57: 845-855, 2018.
44. **X. Zhao**, H. Ngo, D. Walker, D. Weber, D. Maiti, U. Cimenler, A. Petrov, B. Joseph, J. Kuhn. Tri-reforming of surrogate biogas over Ni/Mg/ceria-zirconia/alumina pellet catalysts. Chemical Engineering Communications. 205 (8): 1129-1142, 2018.
43. **X. Zhao**, L. Wei, S. Cheng, J. Julson. Review of heterogeneous catalysts for catalytically upgrading vegetable oils into hydrocarbon biofuels. Catalysts. 7 (3): 83, 2017. (Invited article)
42. **X. Zhao**, L. Wei, S. Cheng, E. Kadis, Y. Cao, E. Boakye, Z. Gu, J. Julson. Hydroprocessing of carinata oil for hydrocarbon biofuel over Mo-Zn/Al_2O_3. Applied Catalysis B: Environmental. 196: 41-49, 2016.
41. **X. Zhao**, L. Wei, J. Julson. Effects of cold press operating conditions on vegetable oil fatty acid profile. International Journal of Green Energy. 13 (10): 990-999, 2016.
40. **X. Zhao**, L. Wei, S. Cheng, J. Julson, G. Anderson, K. Muthukumarappan, C. Qiu. Development of hydrocarbon biofuel from sunflower seed and sunflower meat oils over ZSM-5. Journal of Renewable and Sustainable Energy. 8 (1): 013109, 2016.
39. **X. Zhao**, L. Wei, S. Cheng, Y. Cao, J. Julson, Z. Gu. Catalytic cracking of carinata oil for hydrocarbon biofuel over fresh and regenerated Zn/Na-ZSM-5. Applied Catalysis A: General. 507: 44-55, 2015.
38. **X. Zhao**, L. Wei, S. Cheng, J. Julson. Optimization of catalytic cracking process for upgrading camelina oil to hydrocarbon biofuel. Industrial Crops and Products. 77: 516-526, 2015.
37. **X. Zhao**, L. Wei, S. Cheng, Y. Huang, Y. Yu, J. Julson. Catalytic cracking of camelina oil for hydrocarbon biofuel over ZSM-5-Zn catalyst. Fuel Processing Technology. 139: 117-126, 2015.
36. **X. Zhao**, L. Wei, J. Julson, Z. Gu, Y. Cao. Catalytic cracking of inedible camelina oils to hydrocarbon fuels over bifunctional Zn/ZSM-5 catalysts. The Korean Journal of Chemical Engineering. 32 (8): 1528-1541, 2015.
35. **X. Zhao**, L. Wei, J. Julson, Q. Qiao, A. Dubey, G. Anderson. Catalytic cracking of non-edible sunflower oil over ZSM-5 for hydrocarbon bio-jet fuel. New Biotechnology. 32 (2): 300-312, 2015.
34. **X. Zhao**, L. Wei, J. Julson, Y. Huang. Investigated cold press oil extraction from non-edible oilseeds for future bio-jet fuels production. Journal of Sustainable Bioenergy Systems. 4 (4): 199-214, 2014.
33. **X. Zhao**, L. Wei, J. Julson. First stage of bio-jet fuel production: non-food sunflower oil extraction using cold press method. AIMS Energy. 2 (2): 193-209, 2014.
32. **X. Zhao**, C. Li, H. Wang. Preparation and properties of organic-inorganic modified SiO_2 thin films. Journal of Central South University. 20 (3): 608-614, 2013.
31. **X. Zhao**, C. Li, Q. Liu, Y. Duan, J. He, S. Liu, H. Wang, S. Liang. Study on the preparation and properties of colored iron oxide thin films. Journal of Physics: Conference Series. 419 (1): 012033, 2013.

Co-author papers:

30. P. Luan, **X. Zhao**, K. Copenhaver, S. Ozcan, H. Zhu. Turning natural herbaceous fibers into advanced materials for sustainability. Advanced Fiber Materials. 4: 736-757, 2022.
29. K. Copenhaver, K. Li, L. Wang, M. Lamm, **X. Zhao**, M. Korey, D. Neivandt, B. Dixon, S. Sultana, P. Kelly, W. Gramlich, H. Tekinalp, D. Gardner, S. MacKay, K. Nawaz, S. Ozcan. Pretreatment of lignocellulosic feedstocks for cellulose nanofibril production. Cellulose. 29: 4835-4876, 2022.
28. K. Li, Y. Li, H. Tekinalp, V. Kumar, **X. Zhao**, Y. Pu, A. Ragauskas, K. Nawaz, T. Aytug, S. Ozcan. Hydrogen bond–induced

aqueous-phase surface modification of nanocellulose and its mechanically strong composites. Journal of Materials Science. 57 (17): 8127-8138, 2022.

27. D. Cao, Q. Li, X. Sun, Y. Wang, **X. Zhao**, E. Cakmak, W. Liang, A. Anderson, S. Ozcan, H. Zhu. Amphipathic binder integrating ultrathin and highly ion-conductive sulfide membrane for cell-level high energy density all-solid-state batteries. Advanced Materials. 33 (52): 2105505, 2021.
26. M. Lamm, K. Li, D. Ker, **X. Zhao**, H. Hinton, K. Copenhaver, H. Tekinalp, S. Ozcan. Exploiting chitosan to improve the interface of nanocellulose reinforced polymer composites. Cellulose. 29 (7): 3859-3870, 2022.
25. K. Copenhaver, K. Li, M. Lamm, C. Walker, D. Johnson, Y. Han, L. Wang, **X. Zhao**, Y. Pu, H. Hinton, H. Tekinalp, S. Bhagia, A. Ragauskas, D. Gardner, S. Ozcan. Recycled cardboard containers as a low energy source for cellulose nanofibrils and their use in poly(l-lactide) nanocomposites. ACS Sustainable Chemistry & Engineering. 9 (40): 13460-13470, 2021.
24. L. Wang, K. Li, K. Copenhaver, S. Mackay, M. Lamm, **X. Zhao**, B. Dixon, J. Wang, Y. Han, D. Neivandt, D. Johnson, C. Walker, S. Ozcan, D. Gardner. Review on nonconventional fibrillation methods of producing cellulose nanofibrils and their applications. Biomacromolecules. 22 (10): 4037-4059, 2021.
23. S. Bhagia, K. Bornani, R. Agarwal, A. Satlewal, J. Ďurkovič, R. Lagaňa, M. Bhagia, C. Yoo, **X. Zhao**, V. Kunc, Y. Pu, S. Ozcan, A. Ragauskas. Critical review of FDM 3D printing of PLA biocomposites filled with biomass resources, characterization, biodegradability, upcycling and opportunities for biorefineries. Applied Materials Today. 24: 101078, 2021.
22. S. Lu, M. Hummel, Z. Gu, Y. Wang, K. Wang, R. Pathak, Y. Zhou, H. Jia, X. Qi, **X. Zhao**, B. Xu, X. Liu. Highly efficient urea oxidation via nesting nano-nickel oxide in eggshell membrane-derived carbon. ACS Sustainable Chemistry & Engineering. 9: 1703-1713, 2021.
21. K. Li, D. Mcgrady, **X. Zhao**, D. Ker, H. Tekinalp, X. He, J. Qu, T. Aytug, E. Cakmak, J. Phipps, S. Ireland, V. Kunc, S. Ozcan. Surface-modified and oven-dried microfibrillated cellulose reinforced biocomposites: cellulose network enabled high performance. Carbohydrate Polymers. 256: 117525, 2021.
20. L. Wang, D. Gardner, J. Wang, Y. Yang, H. Tekinalp, M. Tajvidi, K. Li, **X. Zhao**, D. Neivandt, Y. Han, S. Ozcan, J. Anderson. Towards the scale-up production of cellulose nanocomposites using melt processing: a critical review on structure-processing-property relationships. Composites Part B: Engineering. 201: 108297, 2020.
19. Y. Wang, K. Li, **X. Zhao**, H. Tekinalp, T. Li, S. Ozcan. Toughening by nanodroplets: polymer-droplet biocomposite with anomalous toughness. Macromolecules. 53 (11): 4568-4576, 2020.
18. X. Meng, B. Scheidemantle, M. Li, Y. Wang, **X. Zhao**, M. Toro-Gonzalez, P. Singh, Y. Pu, C. Wyman, S. Ozcan, C. Cai, A. Ragauskas. Synthesis, characterization, and utilization of a lignin-based adsorbent for effective removal of azo dye from aqueous solution. ACS Omega. 5 (6): 2865-2877, 2020.
17. K. Li, Y. Wang, M. Rowe, **X. Zhao**, T. Li, H. Tekinalp, S. Ozcan. Poly(lactic acid) toughening through chain end engineering. ACS Applied Polymer Materials. 2: 411-417, 2020.
16. S. Cheng, L. Wei, **X. Zhao**, J. Julson, E. Kadis. Converting alkali lignin to biofuels over NiO/HZSM-5 catalysts using a two-stage reactor. Chemical Engineering & Technology. 40 (6): 1069-1077, 2017.
15. S. Cheng, L. Wei, **X. Zhao**, J. Julson. Application, deactivation and regeneration of heterogeneous catalysts in bio-oil upgrading. Catalysts. 6 (12): 195, 2016.
14. Y. Huang, L. Wei, **X. Zhao**, J. Julson, C. Qiu, S. Dharmarajan, J. Kiratu, D. Raynie, A. Dubey, Q. Qiao. Biofuel production using Pd/Zn synergistically catalyzed hydrodeoxygenation applied at bio oil extracted in biomass pyrolysis process. International Journal of Energy Research. 40: 1724-1730, 2016.
13. Y. Huang, L. Wei, **X. Zhao**, S. Cheng, J. Julson, Y. Cao, Z. Gu. Upgrading pine sawdust pyrolysis oil to green biofuels by HDO over zinc-assisted Pd/C catalyst. Energy Conversion and Management. 115: 8-16, 2016.
12. S. Cheng, L. Wei, **X. Zhao**, E. Kadis, J. Julson. Conversion of prairie cordgrass to hydrocarbon biofuel over Co-Mo/HZSM-5 using a two-stage reactor system. Energy Technology. 4 (6): 706-713, 2016.
11. S. Cheng, L. Wei, **X. Zhao**, E. Kadis, Y. Cao, J. Julson, Z. Gu. Hydrodeoxygenation of prairie cordgrass bio-oil over Ni based

activated carbon synergistic catalysts combined with different metals. New Biotechnology. 33 (4): 440-448, 2016.

10. H. Sieverding, **X. Zhao**, L. Wei, J. Stone. Life-cycle assessment of oilseeds for biojet production using localized cold-press extraction. Journal of Environmental Quality. 45 (3): 967-976, 2016.
9. L. Wei, Y. Gao, W. Qu, **X. Zhao**, S. Cheng. Torrefaction of raw and blended corn stover, switchgrass, and prairie grass. Transactions of the ASABE. 59 (2): 717-726, 2016.
8. C. Li, **X. Zhao**, S. Liang, H. Wang, L. Liu, Z. Huang. Preparation of FTO/SiO_2 composite thin films and the sheet resistance. Rare Metal Materials and Engineering. 45 (S1): 107-110, 2016.
7. S. Cheng, L. Wei, **X. Zhao**. Development of a bifunctional Ni/HZSM-5 catalyst for converting prairie cordgrass to hydrocarbon biofuel. Energy Sources, Part A: Recovery, Utilization, and Environmental Effects. 38 (16): 2433-2437, 2016.
6. S. Cheng, L. Wei, **X. Zhao**, Y. Huang, D. Raynie, C. Qiu, J. Kiratu, Y. Yu. Directly catalytic upgrading bio-oil vapor produced by prairie cordgrass pyrolysis over Ni/HZSM-5 using a two stage reactor. AIMS Energy. 3 (2) 227-240, 2015.
5. Y. Huang, L. Wei, J. Julson, Y. Gao, **X**. **Zhao**. Converting pine sawdust to advanced biofuel over HZSM-5 using a two-stage catalytic pyrolysis reactor. Journal of Analytical and Applied Pyrolysis. 111: 148-155, 2015.
4. S. Wei, G. Wang, **X. Zhao**, X. Zhang, Y. Rong. Experimental study on vacuum carburizing process for low-carbon alloy steel. Journal of Materials Engineering and Performance. 23: 545-550, 2014.
3. Q. Liu, **X. Zhao**. Photovoltaic performance research of dye-sensitized solar cells based on Fe and Ca co-doped TiO_2 thin films. Journal of Wuhan University of Technology. 36 (3): 38-41, 2014.
2. Q. Liu, Y. Zhou, Y. Duan, M. Wang, **X. Zhao**, Y. Lin. Enhanced conversion efficiency of dye-sensitized titanium dioxide solar cells by Ca-doping. Journal of Alloys and Compounds. 548: 161-165, 2013.
1. Q. Liu, Y. Zhou, H. Huang, Q. Guo, **X. Zhao**, Y. Lin. Charge transmission and recombination in the dye-sensitized solar cells based on Mn-doped TiO_2 thin films. Key Engineering Materials. 519: 53-56, 2012.

Patent

3. **X. Zhao**, J. Klett, S. Ozcan, H. Tekinalp, J. Figley. Active metal catalyst. U.S. Patent No. 17/120,408, 2022.
2. S. Ozcan, K. Li, H. Tekinalp, **X. Zhao**, J. Phipps, S. Ireland. Surface-modified and dried microfibrillated cellulose reinforced thermoplastic biocomposites. U.S. Patent No. 17/371,581, 2022.
1. **X. Zhao**, J. Kuhn, D. Walker, B. Joseph. Mixed metal oxide extrudate catalyst. U.S. Patent No. 10618042, 2020.

Book Chapter

2. **X. Zhao**, S. Lu, W. Li, S. Zhang, K. Li, K. Nawaz, P. Wang, G. Yang, A. Ragauskas, S. Ozcan, E. Webb. Epoxy as filler or matrix for polymer composites. "Epoxy-based composites". Samson Jerold Samuel Chelladurai, IntechOpen. 2022. ISBN 978-1-80355-160-9. (Invited book chapter)
1. **X. Zhao**, K. Li, M. Lamm, S. Celik, L. Wei, S. Ozcan. Solid waste gasification: comparison of single- and multi-staged reactors. "Gasification". Valter Silva and Celso Tuna, IntechOpen. 2021. ISBN 978-1-83968-796-9. (Invited book chapter)

Main Honors and Awards

R&D 100 Award Finalist (Bio-nano cellulose composite technology through aqueous-phase functionalization)	2021
Supplemental Performance Award	Oak Ridge National Laboratory 2019
Graduate Research Assistantship	South Dakota State University 01/2013-12/2015
Graduate Leadership and Service Award	AOC 2015
Outstanding Service Award	AOC 2015
Valuable Contribution Award	Chinese Student & Scholar Association, SDSU 2013
Excellent Graduate Leader of Graduation	Beijing Jiaotong University, China 2012
Excellent Graduate Leader	Beijing Jiaotong University, China 2011
Third Prize Scholarship	Beijing Jiaotong University, China 2010

National Aspiration Scholarship for three years	Heilongjiang University, China 2007-2009
Excellent Leader of Students' Union	College of Mechanical Engineering, Heilongjiang University, China 2008
Second Prize of Essay-writing Contest	College of Mechanical Engineering, Heilongjiang University, China 2006

Main Leadership

Chair	Renewable Power Generation Committee ES-210, ASABE 07/2020-07/2022
Vice Chair	Renewable Power Generation Committee ES-210, ASABE 07/2019-07/2020
Secretary	Renewable Power Generation Committee ES-210, ASABE 07/2018-07/2019
Lab Manager	Catalysis and Materials Chemistry Group, University of South Florida 01/2016-03/2018
Lab Manager	Advanced Biofuel Lab, South Dakota State University (SDSU) 08/2014-12/2015
Career Director	
Student Activity Committee (SAC), Association of Overseas Chinese Agricultural Biological Food Engineers (AOC) 2013-2015	
Associate Editor	IMPACT Newsletter, AOC 2013-2015
Secretary	Chinese Student & Scholar Association, SDSU 2013
Class President (Winning University's Advanced Graduate Class Award)	Beijing Jiaotong University, China 09/2010-07/2012

Main Skills

Experienced in Characterization Technology:

Calorimeter	Raman
Tensile stress-strain	ImageJ
X-ray diffraction (XRD)	Rheology
Direct reading spectrometer	Elemental analyzer
Total acid number (TAN) titrator	Karl Fischer titrator
Scanning electron microscopy (SEM)	Brunauer-Emmett-Teller (BET)
Differential scanning calorimetry (DSC)	Thermogravimetric analysis (TGA)
X-ray photoelectron spectroscopy (XPS)	Dynamic mechanical analysis (DMA)
Ultraviolet-visible spectroscopy (UV-Vis)	Transmission electron microscopy (TEM)
Temperature programmed reduction (TPR)	Temperature programmed oxidation (TPO)
Temperature programmed desorption (TPD)	Energy dispersive X-ray spectroscopy (EDX)
Gas chromatography (GC) • mass spectrometry (MS) • GC-MS	Fourier-transform infrared spectroscopy (FT-IR)

Apparatus Repair:

Elemental analyzer • Viscoanalyzer • Karl Fischer titrator • Furnace • Mass flow controller • GC • GC-MS • Calorimeter

Professional Affiliations

Materials Research Society (MRS)	2020-present
American Chemical Society (ACS)	2019-present
Institutes of Food Technologists (IFT)	2013
SME (Society of Manufacturing Engineers)	2021-2022
Next Generation Scientists for Biodiesel (NGSB)	2015
American Association for the Advancement of Science (AAAS)	2015-2016
American Society of Agricultural and Biological Engineers (ASABE)	2013-2015, 2020-present
Association of Overseas Chinese Agricultural Biological Food Engineers (AOC)	2013-2015

Main Services

Guest editor	Applied Surface Science Advances	02/2022-present
Interim Youth Editor	The Innovation	03/2022-present
Journal Editorial Board	Frontiers in Energy Research	03/2022-present
Journal Editorial Board	Engineering Reports	09/2020-present
Journal Editorial Board	Frontiers in Chemical Engineering	09/2019-present
Session Chair	New types of polymers, composites and hybrid materials for AM IV, MRS Fall Meeting and Exhibit,	12/2021
Organizer and Moderator	Current Achievements in Energy live invited session, ASABE Annual International Meeting,	07/2021
Moderator	Renewable Energy Resources and Technologies Q&A Session, ASABE Annual International Meeting,	07/2020
Co-moderator	Renewable Energy Resources and Technologies Invited Session, ASABE Annual International Meeting,	07/2020