Bo Zhao

Spilker Building, Room 231
348 Via Pueblo Mall, Stanford, CA 94305
bzhao89@stanford.edu (678)-882-4628
https://energyzhao.github.io/

EDUCATION

Georgia Institute of Technology (Georgia Tech), Atlanta, GA Aug. 2011 - Dec. 2016
Ph.D. in Mechanical Engineering
Major: Heat Transfer Minor: Optics and Photonics
Advisor: Professor Zhuomin Zhang (Nanoscale Thermal Radiation Laboratory)
Dissertation: *Thermal Radiative Properties of Micro/Nanostructured Plasmonic Metamaterials Including Two-Dimensional (2D) Materials*

University of Science and Technology of China, Hefei, China Sept. 2007 - July 2011
B.S. in Mechanical Engineering Major: Theoretical and Applied Mechanics

RESEARCH EXPERIENCE

Postdoctoral Research Associate, Stanford University
Edward L. Ginzton Laboratory, Advisor: Professor Shanhui Fan Feb. 2017 - Present

- Proposed a magneto-optical photonic crystal that can, for the first time, near completely violate Kirchhoff's law of thermal radiation under a 0.3 Tesla magnetic field
- Solved a 20-year-old problem about how to make a thermophotonic system self-sustaining
- Advanced the concept of photon chemical potential in radiative heat transfer and energy applications
- Designed a high-performance near-field thermophotovoltaic system and a thermophotonic system for low-grade waste heat recovery with record-high power densities

Graduate Research Assistant, Georgia Tech
Nanoscale Thermal Radiation Laboratory, Advisor: Professor Zhuomin Zhang Aug. 2011 - Jan. 2017

- Developed a 2D anisotropic RCWA algorithm for modeling radiative properties of periodic multilayer structures containing anisotropic materials
- Designed a high-performance wavelength-selective emitter using two-dimensional grating/thin-film metamaterials for thermophotovoltaics (TPV) applications
- Demonstrated for the first time ~3500% absorption enhancement in graphene using metamaterials
- Discovered the strong plasmonic coupling and phonon-plasmon coupling phenomena in hybrid structures consisting of 2D materials and metal gratings
- Designed and built an experimental system for near-field radiative heat transfer measurement between planar plates down to 200 nm at room and cryogenic temperatures
- Discovered enhanced near-field heat transfer in 2D heterostructures enabled by surface plasmon-phonon polaritons

Undergraduate Research Assistant, University of Science and Technology of China
Complex Fluid Flow Laboratory Sept. 2009 - July 2011

- Built an experimental system to observe fish cruise swimming and developed a C++ program to simulate fish swimming based on the lattice Boltzmann method

TEACHING EXPERIENCE

Trainee in Speaking and Teaching in English Program, Stanford University
EFSLANG 692 Speaking and Teaching in English Jan. 2018 - Mar. 2018
Peer-assisted microteaching under the instruction of Mr. Seth A. Streichler.

- Improved the appreciation and understanding of effective teaching strategies, intercultural and interpersonal communication patterns, student learning styles, and pedagogical issues by viewing and analyzing recordings of presentations

Lead Graduate Teaching Assistant, Georgia Tech
ME4056 Mechanical Engineering Systems Lab (Undergraduate Level) Aug. 2014 - Aug. 2016
Instructor of 8 comprehensive thermal-fluids labs to over 200 students.

- Coordinated with instructors (Profs. Zhuomin Zhang and Yogendra Joshi), school, and students
- Organized weekly TA meetings, training new TAs, and maintaining lab instruments
- Designed grading guidelines to evaluate students' performance, including lab reports, homework, and notebooks
- Taught lab sections on experimental theory, experimentation, data analysis, including uncertainty analysis and regression analysis
- Delivered three lectures on experimental theory to over 100 students

Graduate Teaching Practicum, Georgia Tech
ME4803/6309A Nanoscale Heat Transfer (Graduate Level) Jan. 2016 - May 2016
Teaching practicum under the mentorship of Prof. Zhuomin Zhang.

- Designed and prepared materials on fundamentals of thermal radiation
- Gave three lectures (totally around 4 hours)
- Prepared homework related to the fundamentals of thermal radiation
- Held office hours to help students with questions in the homework

JOURNAL PUBLICATIONS (*Corresponding author)

1. **Zhao, B.^**, Assawaworrarit, S.^, Santhanam, P., Orenstein, M., and Fan, S., 2020, "Photonic Transformers for DC Voltage Conversion," submitted to ***Nature Electronics***. ^Equal contribution.
2. **Zhao, B.**, Song J., Brongersma, M., and Fan, S., 2020, "Atomic-Scale Control of Coherent Thermal Radiation," submitted to ***ACS Photonics.***
3. **Zhao, B.^**, Guo, C.^, Garcia, C., Narang, P., and Fan, S., 2020, "Axion-Field-Enabled Nonreciprocal Thermal Radiation in Weyl Semimetals," ***Nano Letters***, Vol. 20, pp. 1923−1927. ^Equal contribution.
4. **Zhao, B.*** and Fan, S., 2020, "Chemical Potential of Photons and Its Implications for Controlling Radiative Heat Transfer," ***Annual Review of Heat Transfer*** (invited), Vol. 22, p. 32934.
5. Bhatt, G., **Zhao, B.**, Roberts, S., Lin, T., Datta, I., Mohanty, A., Hartmann J., St-Gelais R., Fan, S., Lipson, M., 2020, "Integrated Near-Field Thermo-Photovoltaics for On-Demand Heat Recycling," ***Nature Communications***, Vol. 11, p. 2545.
6. Guo, C., Zhao, B., Huang, D., and Fan, S., 2020, "Radiative Thermal Router Based on Tunable Magnetic Weyl Semimetals," to appear in ***ACS Photonics.***
7. Asadchy, V., Guo, C., **Zhao, B.**, and Fan, S., 2020, "Sub-Wavelength Passive Optical Isolators Using Photonic Structures Based on Weyl Semimetals," ***Advanced Optical Materials***, p.2000100.
8. Santhanam, P., Li, W., **Zhao, B.**, Rogers, C., Gray, D., Jahelka, P., Atwater, H., and Fan, S., 2020, "Controlling the Dopant Profile for SRH Suppression at Low Current Densities in $\lambda \approx 1330$ nm GaInAsP Light-Emitting Diodes," ***Applied Physics Letters***, Vol. 116, p. 203503.

9. Fan, L., Guo, Y., Papadakis, G., **Zhao, B.**, Zhao, Z., Buddhiraju, S., Orenstein, M., and Fan, S., 2020, "Nonreciprocal Radiative Heat Transfer Between Two Planar Bodies," ***Physical Review B***, Vol. 101, pp. 085407.
10. Papadakis, G., Buddhiraju, S., Zhao, Z., **Zhao, B.**, and Fan, S., 2020, "Broadening Near-Field Emission for Performance Enhancement in Thermophotovoltaics," ***Nano Letters***, Vol. 20, pp. 1654−1661.
11. **Zhao, B.***, Shi, Y., Wang, J., Zhao, Z., Zhao, N., and Fan, S., 2019, "Near-Complete Violation of Kirchhoff's Law of Thermal Radiation with a 0.3 Tesla Magnetic Field," ***Optics Letters***, Vol. 44, No. 17.
12. **Zhao, B.**, Buddhiraju, S., Santhanam., P., Chen, K., and Fan, S., 2019, "Self-Sustaining Thermophotonic Circuits," ***Proceedings of the National Academy of Sciences***, Vol. 116, pp. 11596-11601.
13. Ono, M., Santhanam, P., Li, W., **Zhao, B.**, and Fan, S., 2019, "Experimental Demonstration of Energy Harvesting from the Sky Using the Negative Illumination Effect of a Semiconductor Photodiode," ***Applied Physics Letters***, Vol. 114, p. 161102.
14. Papadakis, G., **Zhao, B.**, Buddhiraju, S., and Fan, S., 2019, "Gate-Tunable Near-Field Heat Transfer," ***ACS Photonics***, Vol. 6, pp. 709-719.
15. Zhao, N., Zhao, Z., Williamson, I, Boutami, S., **Zhao, B.**, and Shanhui Fan, 2019, "High Reflection from a One-Dimensional Array of Graphene Nanoribbons," ***ACS Photonics***, Vol. 6, pp. 339-344.
16. **Zhao, B.**, Santhanam., P., Chen, K., Buddhiraju, S., and Fan, S., 2018, "Near-field Thermophotonic Systems for Low-Grade Waste Heat Recovery," ***Nano Letters***, Vol. 18, pp. 5224-5230. [**Reported by Nature Photonics**]
17. Chen K. **Zhao, B.**, and Fan, S., 2018, "MESH: A Free Electromagnetic Solver for Far- and Near-Field Radiative Heat Transfer for Layered Periodic Structures," ***Computer Physics Communications***, Vol. 231, pp. 163-172.
18. **Zhao, B.**, Chen, K., Buddhiraju, S., Bhatt G., Lipson, M., and Fan, S., 2017, "High-Performance Near-Field Thermophotovoltaics for Waste Heat Recovery," ***Nano Energy***, Vol. 41, p. 344.
19. **Zhao, B.**, Guizal, B., Zhang, Z.M., Fan, S., and Antezza M., 2017, "Near-field Heat Transfer Between Graphene/hBN Multilayers," ***Physical Review B***, Vol. 95, p. 245437.
20. **Zhao, B.***, and Zhang, Z.M., 2017, "Resonance Perfect Absorption by Exciting Hyperbolic Phonon Polaritons in 1D hBN Gratings," ***Optics Express***, Vol. 25, p. 7791.
21. **Zhao, B.**, and Zhang, Z.M., 2017, "Perfect Absorption with Trapezoidal Gratings Made of Natural Hyperbolic Materials," ***Nanoscale and Microscale Thermophysical Engineering***, Vol. 21, p. 123. [**Selected as the cover of the issue**]
22. **Zhao, B.**, and Zhang, Z.M., 2017, "Perfect Mid-Infrared Absorption by Hybrid Phonon-Plasmon Polaritons in hBN/Metal-Grating Anisotropic Structures," ***International Journal of Heat and Mass Transfer***, Vol. 106, p. 1025.
23. **Zhao, B.**, and Zhang, Z.M., 2017, "Enhanced Photon Tunneling by Surface Plasmon-Phonon Polaritons in Graphene/hBN Heterostructures," ***ASME Journal of Heat Transfer***, Vol. 139, p. 022701. [**Top Six Most Cited Articles of the Journal in 2017**]
24. Watjen, J.I.^, **Zhao, B.^**, and Zhang, Z.M., 2016, "Near-Field Radiative Heat Transfer Between Doped-Si Parallel Plates Separated by a Spacing down to 200 nm," ***Applied Physics Letters***, Vol. 109, p. 203112. ^Equal contribution.

25. Watjen, J.I., Liu, X.L., **Zhao, B.**, and Zhang, Z.M., 2016, "A Computational Simulation of Using Tungsten Gratings in Near-Field Thermophotovoltaic Devices," ***ASME Journal of Heat Transfer***, Vol. 139, p. 052704. [**Top Six Most Cited Articles of the Journal in 2017**]
26. **Zhao, B.**, Sakurai, A., and Zhang, Z.M., 2015, "Polarization Dependence of the Reflectance and Transmittance of Anisotropic Metamaterials," ***Journal of Thermophysics and Heat Transfer***, Vol. 30, pp. 240-246.
27. **Zhao, B.**, and Zhang, Z.M., 2015, "Strong Plasmonic Coupling Between Graphene Ribbon Array and Metal Gratings," ***ACS Photonics***, Vol. 2, pp. 1611-1618.
28. **Zhao, B.**, Zhao, J.M., and Zhang, Z.M., 2015, "Resonance Enhanced Absorption in a Graphene Monolayer by Using Deep Metal Gratings," ***Journal of the Optical Society of America B***, Vol. 32, pp. 1176-1185. [**OSA Publishing Top Downloads in June 2015**]
29. Liu, X.L., **Zhao, B.**, and Zhang, Z.M., 2015, "Enhanced Near-Field Thermal Radiation and Reduced Casimir Stiction Between Doped-Si Gratings," ***Physical Review A***, Vol. 91, p. 062510.
30. Sakurai, A., **Zhao, B.**, and Zhang, Z.M., 2015, "Effect of Polarization on Dual-Band Infrared Metamaterial Emitters or Absorbers," ***Journal of Quantitative Spectroscopy and Radiative Transfer***, Vol.158, pp. 111-118.
31. Liu, X.L., **Zhao, B.**, and Zhang, Z.M., 2015, "Blocking-Assisted Infrared Transmission of Subwavelength Metallic Gratings by Graphene," ***Journal of Optics***, Vol. 17, p. 035004.
32. **Zhao, B.**, Zhao, J.M., and Zhang, Z.M., 2014, "Enhancement of Near-Infrared Absorption in Graphene with Metal Gratings," ***Applied Physics Letters***, Vol. 105, p. 031905-1/4.
33. **Zhao, B.**, and Zhang, Z.M., 2014, "Study of Magnetic Polaritons in Deep Gratings for Thermal Emission Control," ***Journal of Quantitative Spectroscopy and Radiative Transfer***, Vol. 135, pp. 81-89.
34. Sakurai, A., **Zhao, B.**, and Zhang, Z.M., 2014, "Resonant Frequency and Bandwidth of Metamaterial Emitters and Absorbers Predicted by an RLC Circuit Model," ***Journal of Quantitative Spectroscopy and Radiative Transfer***, Vol. 149, pp. 33-40.
35. **Zhao, B.**, Wang, L.P., Shuai, Y., and Zhang, Z.M., 2013, "Thermophotovoltaic Emitters Based on a Two-Dimensional Grating/Thin-Film Nanostructure," ***International Journal of Heat and Mass Transfer***, Vol. 67, pp. 637-645.
36. Liu, X.L., **Zhao, B.**, and Zhang, Z.M., 2013, "Wide-Angle Near-Infrared Polarizer with Extremely High Extinction Ratio," ***Optics Express***, Vol. 21, pp. 10502–10510.

BOOK CHAPTER

1. **Zhao, B.**, and Zhang, Z.M., 2016, "Optical and Radiative Properties of Surfaces," *Handbook of Thermal Science and Engineering/Radiative Heat Transfer Section*, Springer, Berlin, Germany.

PROFESSIONAL EXPERIENCE & SERVICE

Grant Proposal Participation

- "Metaphotonics with Weyl Semimetals", MURI, $1.5M/year. Contributions include assisting with designing and writing the whole proposal. Lead PI: Shanhui Fan.
- "Rewriting the Rules of Thermal Emission via Parametric Microphotonic Design", DARPA, $126,930 (first year). Contributions include assisting with the writing of the theoretical part of the proposal. PI: Profs. Michelle Povinelli and Shanhui Fan.
- "Combining 2D Materials with 3D Nanostructures to Control Thermal Radiation", NSF, $300,000. Contributions include discussing the main idea of the proposal, preparing the primary results, developing the experiment plan, and finishing the first draft for the technical section. PI: Prof. Zhuomin Zhang.

Service & Outreach

- Judge for posters in Society-Wide Micro and Nano Technology Forum in ASME International Mechanical Engineering Congress and Exposition (IMECE 2019), Salt Lake City, UT, Nov. 11-14, 2019.
- Topic organizer and session chair for Nanoscale Thermal Radiation Session in ASME International Mechanical Engineering Congress and Exposition (IMECE 2019), Salt Lake City, UT, Nov. 11-14, 2019.
- Volunteer teacher in 2019 Stanford SPLASH, May 4-5, 2019.
- Session chair for Nanoscale Radiation Heat Transfer Session in ASME International Mechanical Engineering Congress and Exposition (IMECE 2018), Pittsburgh, PA, Nov. 12-15, 2018.
- Student assistant for ASME 2012 3rd Micro/Nanoscale Heat & Mass Transfer International Conference (MNHMT2012).

Peer Review

- Reviewer for *Nature Communications*, *Physical Review Letters*, *Scientific Reports*, *Applied Physics Letters*, *Physical Review B*, *Physical Review Applied*, *Optics Express*, *Optics Letters*, *Journal of Quantitative Spectroscopy and Radiative Transfer*, *International Journal of Heat and Mass Transfer*, *Journal of Heat Transfer*, and *Journal of Applied Physics*.
- Reviewer for 6th International Conference on Metamaterials, Photonic Crystals and Plasmonics (META'15), 2016 President's Undergraduate Research Awards (PURA), and 11th Annual Undergraduate Research Spring Symposium in Georgia Tech.

Membership

- Member of ASME (The American Society of Mechanical Engineers), AIAA (The American Institute of Aeronautics and Astronautics), SPIE (The International Society for Optics and Photonics), and OSA (The Optical Society).

HONORS & AWARDS

- Georgia Tech Travel Grant Award — June 2015
- Best Poster Award in ASME International Mechanical Engineering Congress & Exposition (IMECE), San Diego, CA, USA — Nov. 2013
- Best Bachelor's Thesis Award — June 2011
- China National Encouragement Scholarship — Oct. 2009
- First Prize of the 7th China National Zhou Pei-Yuan Competition in Mechanics — May 2009

CONFERENCE PRESENTATIONS

1. **Zhao, B.**, Shi, Y., Wang, J., Zhao, Z., Zhao, N., and Fan, S., 2019, "Near-Complete Violation of Kirchhoff's Law of Thermal Radiation with a 0.3-Tesla Magnetic Field", ASME International Mechanical Engineering Congress and Exposition (IMECE 2019), Salt Lake City, UT, Nov. 11-14. [**Session co-Chair for Nanoscale Thermal Radiation Track.**]
2. **Zhao, B.**, Buddhiraju, S., Santhanam, P., Chen, K., and Fan, S., 2019, "Self-sustaining Thermophotonic Circuits", ASME International Mechanical Engineering Congress and Exposition (IMECE 2019), Salt Lake City, UT, Nov. 11-14. [**Session co-Chair for Nanoscale Thermal Radiation Track.**]
3. Ono, M., Santhanam, P., Li, W., **Zhao, B.**, and Fan, S., 2019, "Experimental Demonstration of Energy Harvesting from the Sky Using the Negative Illumination Effect of a Semiconductor Photodiode", ASME International Mechanical Engineering Congress and Exposition (IMECE 2019), Salt Lake City, UT, Nov. 11-14.

4. **Zhao, B.**, Santhanam, P., Chen, K., Buddhiraju, S., and Fan, S., 2018, "Near-field Thermophotonic Systems for Low-Grade Waste Heat Recovery", ASME International Mechanical Engineering Congress and Exposition (IMECE 2018), Pittsburgh, PA, Nov. 12-15.
5. **Zhao, B.**, Chen, K., Buddhiraju, S., Bhatt, G., Lipson, M., and Fan, S., 2018, "High-Performance Near-field Thermophotovoltaics for Waste Heat Recovery", Materials Research Society Spring Meeting & Exhibit, Phoenix, Arizona, Apr. 2-6.
6. **Zhao, B.**, and Zhang, Z.M., 2017, "Controlling Thermal Radiation with Gratings Made of Natural Hyperbolic Materials," ASME 2017 Summer Heat Transfer Conference, Bellevue, Washington, July 9-12. [**Session co-Chair for Nanoscale Thermal Radiation Track.**]
7. **Zhao, B.**, and Zhang, Z.M., 2016, "Enhanced Near-field Radiative Heat Transfer by Coupled Polaritons in Graphene/hBN Heterostructures," Progress in Electromagnetics Research Symposium (PIERS 2016), Shanghai, China, Aug. 8-11.
8. **Zhao, B.**, and Zhang, Z.M., 2016, "Experimental Demonstration of Near-field Thermal Radiation between Flat Plates at Submicron Distances," Progress in Electromagnetics Research Symposium (PIERS 2016), Shanghai, China, Aug. 8-11. [**Invited.**]
9. **Zhao, B.**, and Zhang, Z.M., 2016, "Perfect Absorption in hBN/Metal Grating Hybrid Anisotropic Structures," Fourth International Conference on Computational Methods for Thermal Problems (THERMACOMP2016), Atlanta, GA, July 6-8.
10. Watjen, J.I., **Zhao, B.**, and Zhang, Z.M., 2015, "Experimental Investigation of Near-Field Thermal Radiation between Flat Plates at Submicron Distances," ASME International Mechanical Engineering Congress and Exposition (IMECE 2015), Abstract No. IMECE2015-51070, Houston, TX, Nov. 13-19.
11. **Zhao, B.**, and Zhang, Z.M., 2015, "Thermal Radiation Control using Coupled Resonances between Graphene Ribbons and Metal Gratings," ASME International Mechanical Engineering Congress and Exposition (IMECE 2015), Abstract No. IMECE2015-51070, Houston, TX, Nov. 13-19.
12. **Zhao, B.**, Zhao, J.M., and Zhang, Z.M., 2015, "Enhanced Absorption of Graphene by Exciting Magnetic Polaritons and Surface Plasmon Polaritons," META'15, the 6th International Conference on Metamaterials, Photonic Crystals and Plasmonics, City College of New York, NYC, NY, Aug. 4-7.
13. **Zhao, B.**, Sakurai, A., and Zhang, Z.M., 2015, "Radiative Properties of Periodic Micro/Nanostructures for Arbitrary Polarization," 19th Symposium on Thermophysical Properties, Boulder, CO, June 21-26. [**Georgia Tech Travel Grant Award**]
14. Liu, X.L., **Zhao, B.**, and Zhang, Z.M., 2015, "Efficient Near-Field Energy Transfer and Relieved Casimir Stiction Between Sub-Wavelength Gratings," American Physical Society (APS) March Meeting, San Antonio, Texas, Mar. 2-6.
15. Sakurai, A., **Zhao, B.**, and Zhang, Z.M., 2014, "Prediction of the Resonance Condition of Metamaterial Emitters and Absorbers Using LC Circuit Model," 15th International Heat Transfer Conference (IHTC-15), Paper number IHTC15-9012/RAD-J-313, Kyoto, Japan, Aug. 10-15.
16. Watjen, J.I., **Zhao, B.**, and Zhang, Z.M., 2014, "An Experiment to Measure Near-field Radiation between Planar Surfaces at Nanoscale Distances," 11th AIAA/ASME Joint Thermophysics and Heat Transfer Conference, Atlanta, GA, June 16-20.
17. Sakurai, A., **Zhao, B.**, and Zhang, Z.M., 2014, "Dual-Band Infrared Metamaterial Emitter and Absorber," 2nd International Workshop on Nano-Micro Thermal Radiation (NanoRad 2014), Shanghai, China, June 6-9.
18. **Zhao, B.**, and Zhang, Z.M., 2013, "Prediction of the Maximum Resonance Wavelength in Deep Gratings Based on Magnetic Polaritons," ASME International Mechanical Engineering Congress and Exposition (IMECE 2013), Abstract No. IMECE2013-67005, San Diego, CA, Nov. 15-21. [**Heat Transfer Best Poster Award at the ASME Society-Wide Micro/Nano Technology Forum**]

19. **Zhao, B.**, Wang, L.P., Shuai, Y., and Zhang, Z.M., 2012, "Excitation of Magnetic Polaritons in 2D Grating/Thin Film Structures for Thermophotovoltaic Emitters," ASME International Mechanical Engineering Congress and Exposition (IMECE 2012), Abstract No. IMECE2011-89081, Houston, TX, Nov. 9-15.
20. McNamara, A., **Zhao, B.**, Joshi, Y., Zhang, Z.M., 2012, "Multilayer Analytical Solution with Time Non-Homogeneous Boundary Conditions for Transient IR Thermal Measurements," 3rd ASME Micro/Nanoscale Heat and Mass Transfer International Conference, Abstract No. MNHMT2012-75366, Atlanta, GA, Mar. 3-6.

INVITED PRESENTATIONS

1. Nanophotonic and Optoelectronic Control of Thermal Radiation for Heat Transfer and Energy Conversion, Department of Mechanical Engineering, University of Houston, Houston, TX, Mar. 3, 2020.
2. Nanophotonic and Optoelectronic Control of Thermal Radiation for Heat Transfer and Energy Conversion, Center for Advanced Life Cycle Engineering, University of Maryland, College Park, MD, Feb. 24, 2020.
3. Nanophotonic and Optoelectronic Control of Thermal Radiation for Heat Transfer and Energy Conversion, Department of Mechanical Engineering, Worcester Polytechnic Institute, Worcester, MA, Feb. 22, 2020.
4. Nanophotonic and Optoelectronic Control of Thermal Radiation for Heat Transfer and Energy Conversion, Department of Mechanical Engineering, Southern Methodist University, Dallas, TX, Feb. 19, 2020.
5. Nanophotonic and Optoelectronic Control of Thermal Radiation for Heat Transfer and Energy Conversion, Department of Mechanical Engineering, University of South Carolina, Columbia, SC, Mar. 26, 2019.
6. Thermal Radiation for Heat Transfer and Energy Conversion, Department of Mechanical Engineering, Carnegie Mellon University, Pittsburgh, PA, Nov. 13, 2018.
7. Thermal Plasmonics for Radiative Heat Transfer and Energy Conversion, School for Engineering of Matter, Transport, and Energy, Arizona State University, Tempe, AZ, Apr. 6, 2018.
8. Thermal Radiation Control Using Nanostructures and 2D Materials, Department of Mechanical Engineering, Stanford University, Stanford, CA, Apr. 5, 2017.
9. Micro/Nanoscale Thermal Radiation Control Using Nanostructures and 2D Materials, College of Energy and Mechanical Engineering, Shanghai University of Electric Power, China, Aug. 8, 2016.
10. Micro/Nanoscale Thermal Radiation Control Using Nanostructures and 2D Materials, Department of Thermal Science and Energy Engineering, University of Science and Technology of China, China, Aug. 5, 2016.
11. Micro/Nanoscale Thermal Radiation Control Using Nanostructures and 2D Materials, School of Energy Science and Engineering, Harbin Institute of Technology, China, July 16, 2016.
12. Micro/Nanoscale Thermal Radiation Control Using Nanostructures and 2D Materials, University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai Jiao Tong University, China, July 14, 2016.