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Department of Materials Science and Engineering, Faculty of Innovation Engineering
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Academic Qualification

Ph.D. in Condensed Matter Physics, Nanjing University, 1996

M.S. in Physics of Semiconductor & Semiconductor Devices, Nanjing University, 1988

B.S. in Semiconductor Physics, Nanchang University (AKA: Jiangxi University), 1982

Teaching Area

Device Physics of Semiconductors

Electrical Engineering and Electronics

Organic Electronics

Organic Optoelectronic Materials and Devices

Research Area

Organic Optoelectronic Materials and Devices

Surface and Interface Studies on Thin Films

Working Experience

01/2021-Present, Professor, Macao Institute of Materials Science and Engineering (MIMSE), Macau University of Science and Technology, Macau, China

03/2009-Present, Professor, Institute of Functional Nano & Soft Materials (FUNSOM), Soochow University, Suzhou, Jiangsu, China

12/2000-03/2009, Senior Research Scientist, Research Laboratories, R&D, Eastman Kodak Company, Rochester, NY 14650, USA

12/1997-12/2000, Associate Professor, Dept. of Phys., Fudan University, Shanghai, (12/1998-6/2000), Research Fellow, Center Of Super-Diamond & Advanced Films (COSDAF), City University of Hong Kong, Hong Kong, SAR, China (On leave from Fudan University)

03/1996-12/1997, Post-Doctoral Fellow, Fudan University, Shanghai, China

07/1988-09/1993, Lecturer (07/1988), Associate Professor (06/1993), Dept. of Phys., Nanchang University, Nanchang, Jiangxi, China

(6/1989-10/1990), Visiting Scholar, California State University, Northridge, CA 91330, USA (On leave from Nanchang University)

01/1982-09/1985, Teaching Assistant, Dept. of Phys., Nanchang University (AKA: Jiangxi University), Nanchang, Jiangxi, China

Academic Publication (selected)

20. S. F. Wang, B. K. Su, X. Q. Wang, Y. C. Wei, K. H. Kuo, C. H. Wang, S. H. Liu, **L. S. Liao***, W. Y. Hung, L. W. Fu, W. T. Chuang, M. Qin, X. H. Lu, C. F. You, Y. Chi*, P. T. Chou*, "Polyatomic molecules with emission quantum yields > 20% enable efficient organic light-emitting diodes in the NIR (II) window", *Nat. Photonics* 16, 843-850 (2022). doi: 10.1038/s41566-022-01079-8

19. Q. Lv, X. D. Wang*, Y. Yu, M. P. Zhuo, M. Zheng*, **L. S. Liao***, "Lattice-mismatch-free growth of organic heterostructure nanowires from cocrystals to alloys", *Nat. Commun.* 13, 3099 (2022). doi: 10.1038/s41467-022-30870-v.

18. M. P. Zhuo, G. P. He, X. D. Wang*, **L. S. Liao***, "Organic superstructure microwires with hierarchical spatial organisation". *Nat. Commun.* 12, 2252 (2021). doi: 10.1038/s41467-021-22513-5.

17. Y. K. Wang, D. Ma, F. Yuan, K. Singh, J. M. Pina, A. Johnston, Y. Dong, C. Zhou, B. Chen, B. Sun, H. Ebe, J. Fan, M. J. Sun, Y. Gao, Z. H. Lu, O. Voznyy*, **L. S. Liao***, E. H. Sargent*, “Chelating-agent-assisted control of CsPbBr₃ quantum well growth enables stable blue perovskite emitters”, *Nat. Commun.* 11, 3674 (2020). doi: 10.1038/s41467-020-17482-0.
16. Y. T. Dong, Y. K. Wang, F. L. Yuan, A. Johnston, Y. Liu, D. X. Ma, M. J. Choi, B. Chen, M. Chekini, S. W. Baek, L. K. Sagar, J. Fan, Y. Hou, M. J. Wu, S. J. Lee, B. Sun, S. Hoogland, R. Quintero-Bermudez, H. Ebe, P. Todorovic, F. Dinic, P. C. Li, H. T. Kung, M. I. Saidaminov, E. Kumacheva, E. Spiecker, **L. S. Liao**, O. Voznyy, Z. H. Lu*, and E. H. Sargent*, “Bipolar-shell resurfacing for blue LEDs based on strongly confined perovskite quantum dots”, *Nat. Nanotechnology* 15, 668-674 (2020). doi: 10.1038/s41565-020-0714-5.
15. Y. C. Wei, S. F. Wang, Y. Hu, **L. S. Liao***, D. G. Chen, K. H. Chang, C. W. Wang, S. H. Liu, W. H. Chan, J. L. Liao, W. Y. Hung, T. H. Wang, P. T. Chen, H. F. Hsu, Y. Chi*, P. T. Chou*, “Overcoming the energy gap law in near-infrared OLEDs by exciton–vibration decoupling”, *Nat. Photonics* 14, 570-577 (2020). doi: 10.1038/s41566-020-0653-6
14. X. Tang, L. S. Cui*, H. C. Li, A. J. Gillett, F. Auras, Y. K. Qu, C. Zhong, S. T. E. Jones, Z. Q. Jiang*, R. H. Friend*, **L. S. Liao***, “Highly efficient luminescence from space-confined charge-transfer emitters”, *Nat. Mater* 19, 1332-1338 (2020). doi: 10.1038/s41563-020-0710-7
13. M. P. Zhuo, J. J. Wu, X. D. Wang*, Y. C. Tao, Y. Yuan, **L. S. Liao***, “Hierarchical self-assembly of organic heterostructure nanowires”. *Nat. Commun.* 10, 3839 (2019). doi: 10.1038/s41467-019-11731-7.
12. L. S. Cui, S. B. Ruan, F. Bencheikh, R. Nagata, L. Zhang, K. Inada, H. Nakanotani, **L.S. Liao***, C. Adachi*, “Long-lived efficient delayed fluorescence organic light-emitting diodes using n-type hosts”, *Nat. Commun.* 8, 2250 (2017). doi: 10.1038/s41467-017-02419-x.
11. **L. S. Liao**, S.T. Lee*, “Materials science in China”, *Nat. Rev. Mater.* 1, 16025 (2016). doi: 10.1038/natrevmats.2016.25.
10. C. C. Zhang, Z. K. Wang*, S. Yuan, R. Wang, M. Li, M. F. Jimoh, **L. S. Liao***, Y. Yang*, “Polarized ferroelectric polymers for high - performance perovskite solar cells”. *Adv. Mater.* 31, 1902222 (2019).
9. M. Li, Y. G. Yang, Z. K. Wang*, T. Kang, Q. Wang, S. Turren - Cruz, X. Y. Gao, C. S. Hsu, **L. S. Liao***, A. Abate*, “Perovskite grains embraced in a soft fullerene network make highly efficient flexible solar cells with superior mechanical stability” *Adv. Mater.* 31, 1901519 (2019)
8. S. Yuan, Z. K. Wang*, L. X. Xiao, C. F. Zhang, S. Y. Yang, B. B. Chen, H. T. Ge, Q. S. Tian, Y. Jin, **L. S. Liao***, “Optimization of low-dimensional components of quasi-2D perovskite films for deep-blue light-emitting diodes” *Adv. Mater.* 1904319 (2019)
7. Y. L. Zhang, Q. Ran, Q. Wang, Y. Liu, C. Hänisch, S. Reineke, J. Fan*, **L. S. Liao***, “High-efficiency red organic light - emitting diodes with external quantum efficiency close to 30% based on a novel thermally activated delayed fluorescence emitter” *Adv. Mater.* 31, 1902368 (2019)
6. M. Li, Z. K. Wang*, M.P. Zhuo, Y. Hu, K. H. Hu, Q. Q. Ye, S. M. Jain, Y. G. Yang, X. Y. Gao, **L. S. Liao***, “Pb-Sn-Cu ternary organometallic halide perovskite solar cells”. *Adv. Mater.* 30, 1800258 (2018).
5. M. K. Fung, Y. Q. Li, and **L. S. Liao***, “Tandem organic light-emitting diodes”, *Adv. Mater.* 28, 10381 (2016).
4. Z. K. Wang, M. Li, Y. G. Yang, Y. Hu, H. Ma, X. Y. Gao*, **L. S. Liao***, “High efficiency Pb-In binary metal perovskite solar cells”. *Adv. Mater.* 28, 6695 (2016).
3. X. B. Shi, Y. Hu, B. Wang, L. Zhang, Z. K. Wang*, **L. S. Liao***, “Conductive inorganic–organic hybrid distributed Bragg reflectors”. *Adv. Mater.* 27, 6696 (2015).
2. L. S. Cui, Y. M. Xie, Y. K. Wang, C. Zhong, Y. L. Deng, X. Y. Liu, Z. Q. Jiang*, **L. S. Liao***, “Pure hydrocarbon hosts for ~100% exciton harvesting in both phosphorescent and fluorescent light-emitting devices”. *Adv. Mater.* 27, 4213 (2015).
1. **L. S. Liao***, W. K. Slusarek, T. K. Hatwar, M. L. Ricks, and D. L. Comfort, “Tandem organic light-emitting diode using hexaazatriphenylene hexacarbonitrile in the intermediate connector”, *Adv. Mater.* 20(2), 324 (2008).

Books

L.S. Liao, C.S. Lee, S.T. Lee, M. Inbasekaran, and W.W. Wu, “Metal/polyfluorene interface and surface: structures and stability” (Chapter 12), In “*Conjugated Polymer and Molecular Interfaces: Science and Technology for Photonic and Optoelectronic Applications*”, Ed. by W.R. Salaneck, K. Seki, A. Kahn, and J.J. Pireaux, published by Marcel Dekker, September 2002, USA, p. 401

Patents (selected)

20. **L. S. Liao**, M. W. Culver, and C. W. Tang, “Fluorocarbon electrode modification layer”, **US7,799,439 B2** (September 21, 2010).
19. **L. S. Liao**, W. Slusarek, M. Ricks, R. H. Young, and D. L. Comfort, “OLED electron-injecting layer”, **US7.629.741 B2** (December 8, 2009).

18. **L. S. Liao**, T. K. Hatwar, K. P. Klubek, D. L. Comfort, and C. W. Tang, "White OLEDs having a color compensated electroluminescent unit". **US7,560,862 B2** (July 14, 2009).
17. **L. S. Liao**, K. P. Klubek, and C. W. Tang, "Color organic OLED device", **US7,528,545 B2** (May 5, 2009).
16. **L. S. Liao**, W. Slusarek, T. K. Hatwar, M. L. Ricks, and D. L. Comfort, "Tandem OLED having an organic intermediate connector". **US7,494,722 B2** (February 24, 2009).
15. **L. S. Liao**, T. K. Hatwar, K. P. Klubek, and C. W. Tang, "White OLED having multiple white electroluminescence units". **US7,273,663 B2** (September 25, 2007).
14. **L. S. Liao** and K. P. Klubek, "Using a crystallization-inhibitor in organic electroluminescent devices", **US7,211,948 B2** (May 1, 2007).
13. **L. S. Liao** and K. P. Klubek, "Organic electroluminescent devices having a stability-enhancing layer", **US7,138,763 B2** (November 21, 2006).
12. **L. S. Liao** and C. W. Tang, "Tandem OLED having stable intermediate connectors", **US7,126,267 B2** (October 24, 2006).
11. **L. S. Liao**, T. K. Hatwar, K. P. Klubek, J. R. Vargas, and D. L. Comfort, "Tandem OLED having low drive voltage". **US7,075,231 B1** (July 11, 2006).
10. **L. S. Liao**, K. P. Klubek, and C. W. Tang, "A full-color organic display having improved blue emission", **US7,030,554 B2** (April 18, 2006).
9. **L. S. Liao**, K. P. Klubek, D. L. Comfort, and C. W. Tang, "Cascaded organic electroluminescent device having connecting units with n-type and p-type organic layers". **US6,936,961 B2** (August 30, 2005).
8. **L. S. Liao** and K. P. Klubek, "Blue organic electroluminescent devices having a non-hole-blocking buffer layer". **US6,881,502 B2** (April 19, 2005).
7. **L. S. Liao** and C. W. Tang, "Providing an organic electroluminescent device having stacked electroluminescent units". **US6,872,472 B2** (March 29, 2005).
6. **L. S. Liao**, K. P. Klubek, and D. L. Comfort, "Providing an emission-protecting layer in an OLED device", **US6,853,133 B2** (February 8, 2005).
5. **L. S. Liao** and J. K. Madathil, "Organic electroluminescent devices having a metal sub-layer within a hole-transporting region". **US6,818,329 B1** (November 16, 2004).
4. **L. S. Liao**, J. K. Madathil, P. K. Raychaudhuri, and C. W. Tang, "Organic electroluminescent device having an adhesion-promoting layer for use with a magnesium cathode", **US6,794,061 B2** (September 21, 2004).
3. **L. S. Liao**, J. K. Madathil, K. P. Klubek, D. L. Comfort, and C. W. Tang, "OLED device with a performance-enhancing layer". **US6,781,149 B1** (August 24, 2004).
2. **L. S. Liao**, K. P. Klubek, D. L. Comfort, and C. W. Tang, "Cascaded organic electroluminescent devices with improved voltage stability". **US6,717,358 B1** (April 6, 2004).
1. **L. S. Liao**, J. K. Madathil, K. P. Klubek, and C. W. Tang, "Organic light-emitting diode having an interface layer between the hole-transporting layer and the light-emitting layer", **US6,603,150 B2** (August 5, 2003).

Professional Certification and Awards

- Second Prize, Technology invention of the Science and Technology Award of the Chinese Institute of Electronics (Ranked No.1). 2021.
- Second Prize, China Industry-University-Research Cooperation Innovation Achievement Award (Ranked No.1). 2021.
- Second Prize, the National Teaching Achievement Award in Higher Education (Ranked 5th). 2018.
- Second Prize, Technology Invention Award for Outstanding Achievement in Scientific Research of Higher Education (Ranked No.1). 2017.
- Grand Prize, Jiangsu Teaching Achievement Award (Higher Education) (Ranked 6th), 2017.
- Model Worker, awarded by Suzhou City Government, 2015.
- Ten Year Contribution Award, issued by the National Semiconductor Lighting Engineering R&D and Industry Alliance. 2014.
- Jiangsu Overseas Chinese Contribution Award, 2013.
- Excellent Educator in Suzhou, 2012.
- Suzhou Top Ten Charming Science and Technology Figures Finalist Award, 2011.
- Outstanding Contribution Award for Major Research Projects, Soochow University, 2011.
- Outstanding Contribution Award for Major Research Projects, Soochow University, 2010.
- Selected into the "High-level Innovation and Entrepreneurship Talent Plan", Jiangsu Province. 2009.
- Selected as a National Distinguished Expert, 2009.

Distinguished Inventor, awarded by Eastman Kodak Company, 2007.
First Prize, Science and Technology Progress Award of Jiangsu Province (Ranked 6th), 1998.

Student Awards

National Scholarship for Graduate Students, 2013-2022, 16 students.
National Scholarship, awarded by the national high-level university postgraduate overseas-exchange program. 2015-2021. over 5 students.
Second Prize, "Challenge Cup" National College Students Extracurricular Academic Science and Technology Works Competition. 2015. 2 students
Third Prize, "Challenge Cup" National College Students Extracurricular Academic Science and Technology Works Competition. 2019. 5 students
Grand Prize, "Challenge Cup" Provincial College Students Extracurricular Academic Science and Technology Works Competition. Jiangsu Province. 2019. 5 students.
Second Prize, "Challenge Cup" Provincial College Students Extracurricular Academic Science and Technology Works Competition. Jiangsu Province. 2015. 3 students.
Excellent Doctoral Dissertation Award, Jiangsu Province, 2019.
Excellent M.S graduate thesis award, Jiangsu Province; 2018-2021; 3 students.
Excellent undergraduate thesis award, Jiangsu Province; 2012-2016. 2 students.
The 16th International Meeting on Information--Display (IMID 2016) KIDS Award, 2016.
The Best Poster Paper Award, PV Technology International Conference, 2017.
Outstanding Poster Paper Award, The 22nd International Display Workshops, 2015.
Outstanding Graduate Scholarship, Soochow University; 2013-2021, 35 students.
Outstanding Graduate Cadres Award, Soochow University, 2019-2021; 3 students.
Zhu Jingwen Scholarship, Soochow University, 2016-2019, 3 students.
First Prize, outstanding achievements in innovation and entrepreneurship of college students. Soochow University. 2014.

Professional Society Membership

Associate Editor, Applied Physics Letters
Member, OLED Subcommittee, Society for Information Display (SID), USA
Member, Wide Bandgap Semiconductor Subcommittee, The Nonferrous Metals Society of China (NFsoc)
Member, The Chinese Chemical Society