

Kung-Yen Lee

1 Sec. 4 Roosevelt Rd
Taipei 10617
Taiwan
Tel: (+886) 2 33665742
Email: kylee@ntu.edu.tw

Expertise

Semiconductor Physics, Semiconductor Processing, SiC Materials, and Renewable Energy

Employment Experience

- 2014– present Associate Professor at Department of Engineering Science and Ocean Engineering in National Taiwan University
- 2010 – 2014 Assistant Professor at Department of Engineering Science and Ocean Engineering in National Taiwan University
- 2010– 2014 Assistant Professor at Department of Mechatronic Engineering in National Taiwan Normal University
- 2006 – 2009 Assistant Professor at Department of electrical Engineering in National Chung Cheng University
- 2006– 2006 Post-doctor at Birk Nanotechnology Center in Purdue University

Education

- 2000–2005 Ph.D. in Electrical & Computer Engineering
Purdue University, West Lafayette, IN, USA
- 1998-2000 M.S. in Electrical & Computer Engineering
Purdue University, West Lafayette, IN, USA
- 1991-1995 B.S. in Electrical & Control Engineering
National Chiao Tung University, Hsinchu, Taiwan

Publications/Journal Papers

1. Ting-Junk Kuo, Jau-Horng Chen, Chien-Kang Huang, Shin-Yi Lee, Chih-Fang Huang, and **Kung-Yen Lee**, "State of charge modeling of Lithium-ion batteries using dual exponential functions," *Journal of Power Sources*, 2015 (Revised)
2. Yuan-Heng Liu, Chih-Fang Huang, Sheng-Zhong Wang, and **Kung-Yen Lee**, "Dislocated square array JBS with enhanced forward current density and reverse breakdown voltage," *IEEE Transactions on Electron Devices*, 2015 (Submitted)
3. Bin-Juine Huang, Po-Chien Hsu, Wei-Chiuan Lin, Yu-Jen Chang, Cheng-Jui Chang, Kang Li, and **Kung-Yen Lee**, "Effect of switching scheme on the performance of hybrid solar PV system," *Renewable Energy*, 2015 (Submitted)
4. Bin-Juine Huang, Tung-Fu Hou, Po-Chien Hsu, Tse-Han Lin, Yan-Tze Chen, Chi-Wen Chen, Kang Li, and **Kung-Yen Lee**, "Design of direct solar PV driven air conditioner," *Renewable Energy*, Vol. 88, p. 95-101, 2016
5. Ting-Fu Chang, Chih-Fang Huang, Tsung-Yu Yang, Chien-Wei Chiu, Tsung-Yi Huang, **Kung-Yen Lee**, and Feng Zhao, "*Low turn-on voltage dual metal AlGaIn/GaN Schottky barrier diode*," *Solid State Electronics*, Vol. 105, p. 12-15, 2015 (SCI IF: 1.514)
6. Chih-Fang Huang, Hua-Chih Hsu, Kuan-Wei Chu, Li-Heng Lee, Ming-Jinn Tsai, **Kung-Yen Lee**, and Feng Zhao, "*Counter-doped JTE, an edge termination for HV SiC devices with increased tolerance to the surface charge*," *IEEE Transactions on Electron Devices*, Vol. 62, no. 2, p. 354-358, 2015 (SCI, IF: 2.267)

7. **Kung-Yen Lee**, Chao-Yang Liu, Chia-Chi Sung; Lung-Hao Hu, "Influence of ink preparation with the untreated and the burned Pt/C catalysts for proton exchange membrane fuel cells," International Journal of Hydrogen Energy, Vol. 39, no. 22, p. 11454-11461, 2014 (SCI IF: 3.548)
8. Shin-Yi Lee, Wei-Li Chiu, Yi-Shuo Liao, **Kung-Yen Lee**, Huei-Jeng Lin and Kang Li, "Modified empirical fitting of the discharge behavior of LiFePO₄ batteries under various conditions," ANZIAM Journal, Vol. 55, p. C368--C383, 2014 (SCI IF: 1.043)
9. Shuen-De Wu, Chiu-Wen Wu, Shiou-Gwo Lin, **Kung-Yen Lee**, and Chung-Kang Peng, "Analysis of Complex Time Series Using Refined Composite Multiscale Entropy," Physics Letters A, Vol. 378, p. 1369-1374, 2014 (SCI, IF:1.776)
10. Meng-Han Wu, Hou-Chung Lin, Chih-Jie Lee, **Kung-Yen Lee**, and Jau-Horng Chen, "A balanced pulse-modulated polar transmitter for improved efficiency and stability using power recycling," Microwave and Optical Technology Letters, Vol. 56, No. 6, p. 1452-1454, 2014 (SCI, IF: 0.585)
11. Le-Shan Chan, Yu-Hao Chang and **Kung-Yen Lee**, "Analysis of C-face 4H-SiC MOS capacitors with ZrO₂ gate dielectric," Materials Science Forum, Vols. 778-780, p. 635-638, 2014 (EI)
12. Shuen-De Wu, Chiu-Wen Wu, **Kung-Yen Lee**, Shiou-Gwo Lin, "Modified multiscale entropy for short-term time series analysis," Physica A: Statistical Mechanics and its Applications, Vol. 392, p. 5865–5873, 2013 (SCI, IF:1.676)
13. Shuen-De Wu, Chiu-Wen Wu, Shiou-Gwo Lin, Chun-Chieh Wang, and **Kung-Yen Lee**, "Time Series Analysis Using Composite Multiscale Entropy," Entropy, Vol. 15, p. 1069-1084, 2013 (SCI, IF: 1.183)
14. **Kung-Yen Lee**, Yu-Hao Chang, Yan-Hao Huang, Shuen-De Wu, Cheng Yueh Chung, Chih-Fang Huang, and Tai-Chou Lee, "Influence of Low Temperature Oxidation and Nitrogen Passivation on the MOS Interface of C-face 4H-SiC," Applied Surface Science, Vol. 288, p. 126– 132, 2013 (SCI, IF:2.112)
15. **Kung-Yen Lee**, Yu-Hao Chang, Yan-Hao Huang, Chih-Fang Huang, Cheng Yueh Chung, and Feng Zhao, "Characterization for N- and P-type 3C-SiC on Si (1 0 0) substrate with thermal anneal and pulsed excimer laser anneal," Applied Surface Science, Vol. 266, p. 46– 50, 2013 (SCI, IF:2.112)
16. **Kung-Yen Lee** and Yan-Hao Huang, "An Investigation on Barrier Inhomogeneities of 4H-SiC Schottky Barrier Diodes Induced by Surface Morphology and Traps," IEEE Transactions on Electron Devices, Vol. 59, no. 3, p. 694-699, 2012 (SCI, IF: 2.267)
17. Wen-Shan Lee, Kuan-Wei Chu, Chih-Fang Huang, Lorn-Shen Lee, Min-Jinn Tsai, **Kung-Yen Lee**, and Feng Zhao, "Design and Fabrication of 4H-SiC Lateral High Voltage Devices on Semi-Insulating Substrate," IEEE Transactions on Electron Devices, Vol. 59, no. 3, p. 754-760, 2012 (SCI, IF: 2.267)
18. **Kung-Yen Lee**, Yan-Hao Huang, Chih-Fang Huang, Cheng Yueh Chung, Shun Chiu Lin, and Feng Zhao "XRD Characterization for Al and N Doped 3C-SiC on Si (100) Substrate after Pulsed Excimer Laser Anneal," Material Science Forum, Vol. 717-720, pp 497-500, 2012 (EI).
19. Zhe Chuan Feng, Cheng Chen, Qiang Xu, Suwan P. Mendis, Ling-Yun Jang, Chin-Che Tin, **Kung-Yen Lee**, Chee Wee Liu, Zhengyun Wu, and Zhi Ren Qiu, "Raman scattering and X-ray absorption from CVD grown 3C-SiC on Si," Material Science Forum, Vol. 717-720, pp 505-508, 2012 (EI).
20. Shuen De Wu, Chiu-Wen Wu, Cha-Lin Liu, Yan-Hao Huang, and **Kung-Yen Lee**, "A Novel Gaussian Window Approach for Empirical Mode Decomposition," Advanced Materials Research Vol. 457-458, p. 274-277, 2012 (EI)
21. Yu-Li Tu, Yan-Hao Huang, Lingmin Kong, **Kung-Yen Lee**, Ling-Yun Jang, Chin-Che Tin, Chee-Wee Liu, Zhe Chuan Feng, "Synchrotron Radiation X-ray Absorption and Optical Studies of Cubic SiC Films Grown on Si by Chemical Vapor Deposition," Advanced Materials Research Vol. 306-307 p. 167-170, 2011 (EI)
22. Hsiao-Chun Wu, Hung-Yi Chen, and **Kung-Yen Lee**, "Unveiling the Core Technology Structure for Companies through Patent Information," Technological Forecasting and Social Change Vol. 77, no. 7, p. 1167-1178, 2010 (SSCI, IF: 1.761)

23. Yaow-Ming Chen, Hsu-Chin Wu, Yung-Chu Chen, **Kung-Yen Lee** and Shian-Shing Shyu, "AC Line Current Regulation Strategy for Grid-Connected PV System," IEEE Transactions on Power Electronics, Vol. 25, no. 1, p. 209-218, 2010 (SCI, IF: 2.929)
24. **Kung-Yen Lee**, Shin-Yi Lee, and Chih-Fang Huang, "Doping Concentration and Surface Morphology of 4H-SiC C-Face Epitaxial Growth," Material Science Forum, Vol. 645-648, p. 123-126, 2010 (EI)
25. Chih-Fang Huang, Cheng-Li Kan, Tian-Li Wu, Meng-Chia Lee, Yo-Zthu Liu, **Kung-Yen Lee** and Feng Zhao, "3510V 390mΩ-cm² 4H-SiC Lateral JFET on a Semi-insulating Substrate," IEEE Electron Device Letters, Vol. 30, no. 9, p. 957-959, 2009 (SCI, IF: 3.049)
26. **Kung-Yen Lee**, Wenzhou Chen, and Michael A. Capano, "The Impact of Chemical Mechanical Polishing on Defective 4H-SiC Schottky Barrier Diodes," Material Science Forum, Vol. 600-603, p. 827-830, 2009 (EI)
27. **Kung-Yen Lee**, "Correlation of the growth rate for selective epitaxial growth of silicon and oxide thickness and oxide coverage in a reduced pressure chemical vapor deposition pancake reactor," Journal of Vacuum Science and Technology B, Vol.26, no. 5, p. 1712-1717, 2008 (SCI, IF: 1.460)
28. Yaow-Ming Chen, Hsu-Chin Wu, Ming-Wei Chou, and **Kung-Yen Lee**, "On-Line Failure Prediction of the Electrolytic Capacitor for LC filter of Switching-Mode Power Converters," IEEE Transactions on Industrial Electronics, Vol.55, no. 1, p. 400-406, 2008 (SCI, IF: 4.678)
29. **Kung-Yen Lee**, Chih-Fang Huang, Wenzhou Chen, and Michael A. Capano, "The Impact of Surface Morphology on C- and Si-Face 4H-SiC Schottky Barrier Diodes," Physica B: Condensed Matter. Vol. 401-402, p. 41-43, 2007 (SCI, IF: 0.751)
30. **Kung-Yen Lee** and Michael A. Capano, "The Correlation of Surface Defects and ReverseBreakdown of 4H-SiC Schottky Barrier Diodes," Journal of Electronic Materials, Vol. 36, no. 4, p. 272-276, 2007 (SCI, IF: 1.428)
31. Wenzhou Chen, **Kung-Yen Lee**, and Michael A. Capano, "Growth and Characterization of Nitrogen-Doped C-Face 4H-SiC Epilayers," Journal of Crystal Growth, Vol. 297, no. 2, p. 265-271, 2006 (SCI, IF: 1.809)

Conferences

1. Zih-Yeh Lin, Chi-Yao Chung, Chiao Fu, Kuan-Ming Li, Kang Li, Huei-Jeng Lin, and **Kung-Yen Lee**, "Mathematical modeling for lithium iron battery capacity variation with different charge cycles," The 12th Engineering Mathematics and Applications Conference, EMAC, Adelaide, Australia, Dec. 6-9, 2015
2. Lung-Chieh Lee, Yuan-Heng Liu, **Kung-Yen Lee**, Chih-Fang Huang, Jen-Hua Wei, and Wesley Chih-Wei Hsu, "Novel Dual Trench 4H-SiC AccuFET with Ultra-low On-state Resistance and Enhanced Oxide Robustness," ICSCRM, Giardini Naxos, Italy, October 4-9, 2015
3. Chieh-Wen Tseng, **Kung-Yen Lee**, Huei-Jeng Lin, Yin-Pai Lin, Jia-Han Li, and Da-Sun Liu, "A high turbulence measurement at rooftop of Taipei College of Maritime Technology," IEA Task 27, Zhangbei, China, Aug. 28-29, 2014
4. **Kung-Yen Lee**, Wei-Li Chiu and Yi-Shuo Liao, "A Mathematics Model for Discharging Behavior of LiFePO₄ Battery," The 11th Engineering Mathematics and Applications Conference, EMAC13, Brisbane, Australia, Dec. 1-4, 2013
5. Le-Shan Chan, Cheng-Yueh Chung, Yu-Hao Chang, and **Kung-Yen Lee**, "Analysis of C-face 4H-SiC MOS capacitors with ZrO₂ gate dielectric," The International Conference on Silicon Carbide and Related Materials, ICSCRM2013, Miyazaki, Japan, Sept. 29-Oct. 4, 2013
6. **Kung-Yen Lee**, Yan-Hao Huang, Chih-Fang Huang, and Yu-Hao Chang, "Investigation of MOS Interface of 4H-SiC C-Face Epitaxial Layer," The 7th international conference on advanced materials, ROCAM, Romania, Aug.28-31, 2012
7. **Kung-Yen Lee**, Yan-Hao Huang, Chih-Fang Huang, Cheng Yueh Chung, Shun Chiu Lin, and Feng Zhao, "Characterization for N- and P-type 3C-SiC on Si (100) Substrate with Thermal Anneal and Pulsed Excimer Laser Anneal," Thin Films Conference, Singapore, Jul., 2012

8. Shuen De Wu, Chiu-Wen Wu, Cha-Lin Liu, Yan-Hao Huang, and Kung-Yen Lee, "*A Novel Gaussian Window Approach for Empirical Mode Decomposition*," 2011 International Conference on Advanced Materials and Engineering Materials (ICAMEM 2011)
9. **Kung-Yen Lee**, Yan-Hao Huang, Chih-Fang Huang, Cheng Yueh Chung, Shun Chiu Lin, and Feng Zhao "*XRD Characterization for Al and N Doped 3C-SiC on Si (100) Substrate after Pulsed Excimer Laser Anneal*," International Conference on Silicon Carbide and Related Materials (ICSCRM), USA, Sept., 2011
10. Zhe Chuan Feng, Cheng Chen, Qiang Xu, Suwan P. Mendis, Ling-Yun Jang, Chin-Che Tin, **Kung-Yen Lee**, Chee Wee Liu, Zhengyun Wu, and Zhi Ren Qiu, "*Raman scattering and X-ray absorption from CVD grown 3C-SiC on Si*," International Conference on Silicon Carbide and Related Materials (ICSCRM), USA, Sept., 2011
11. Hsiao-Chung Wu, Hung-Yi Chen, and **Kung-Yen Lee**, "*A Method for Assessing Patent Similarity Using Direct and Indirect Citation Links*," IEEE International Conference on Industrial Engineering and Engineering Management, IEEM 2010, Macau, Dec. 7-10, 2010
12. **Kung-Yen Lee**, Yi-Li Tu, Yan-Hao Huang, Ling-Yun Jang, and Zhe Chuan Feng, "*Investigation of Extended X-ray Absorption Fine Structure on 6H-SiC Bond Length*," JSPS-DST Asian Academic Seminar, Kolkata, India, Nov. 29 – Dec. 4, 2010
13. **Kung-Yen Lee**, Yi-Li Tu, and Zhe Chuan Feng, "*Investigation of Extended X-ray Absorption Fine Structure on 6H-SiC*," IUMRS -ICA 2010, 11th IUMRS International Conference in Asia, Qingdao, China, Sept. 25-28, 2010
14. Tsai-Fu Wu, Chih-Hao Chang, Yong-Dong Chang, and **Kung-Yen Lee**, "*Power Loss Analysis of Grid Connection Photovoltaic Systems*," 2009 IEEE PEDS Taipei, Taiwan, Nov. 2-5, 2009
15. Tsai-Fu Wu, Yong-Dong Chang, Chih-Hao Chang, He-Xing Lee, **Kung-Yen Lee**, and Jeng-Gung Yang, "*A 5 kW Boost Converter with Various Passive/Active Snubbers for Reducing Component Stress and Achieving High Efficiency*," 2009 IEEE PEDS Taipei, Taiwan, Nov. 2-5, 2009
16. **Kung-Yen Lee**, Gao-De Zeng, and Chih-Fang Huang, "*Doping Concentration and Surface Morphology of 4H-SiC C-Face Epitaxial Growth*," International Conference on Silicon Carbide and Related Materials (ICSCRM), Germany, October, 2009
17. Chih-Fang Huang, Cheng-Li Kan, Tian-Li Wu, Meng-Chia Lee, Yo-Zthu Liu, **Kung-Yen Lee** and Feng Zhao, "*High Voltage 4H-SiC Lateral JFET on a Semi-insulating Substrate*," Device Research Conference (DRC), USA, June, 2009
18. **Kung-Yen Lee**, J-H. Niu, and G-W. Lin, "*A Simplified Analog Control Circuit of a Maximum Power Point Tracker*," IEEE 33rd Photovoltaic Energy Specialist Conference (PVSC), USA, May, 2008
19. **Kung-Yen Lee**, Wenzhou Chen, and Michael A. Capano, "*The Impact of Chemical Mechanical Polishing on Defective 4H-SiC Schottky Barrier Diodes*," International Conference on Silicon Carbide and Related Materials (ICSCRM), Japan, October, 2007
20. **Kung-Yen Lee**, Wenzhou Chen, and Michael A. Capano, "*The Impact of Surface Morphology on C- and Si-Face 4H-SiC Schottky Barrier Diodes*," International Conference on Defects in Semiconductors (ICDS24), NM, July, 2007
21. **Kung-Yen Lee**, Wenzhou Chen, and Michael A. Capano, "*Surface Morphology, Doping and Oxide Field of 4H-SiC C-Face Epitaxial Layer*," TMS, Electronic Materials Conference, PA, June, 2006
22. Wenzhou Chen, **Kung-Yen Lee**, and Michael A. Capano, "*Growth and Characterization of Nitrogen-doped C-Face 4H-SiC Epilayers*," TMS, Electronic Materials Conference, PA, June, 2006
23. **Kung-Yen Lee** and Michael A. Capano, "*The Influence of Surface Defects on the Characteristics of 4H-SiC Schottky Barrier Diodes*," International Conference on Silicon Carbide and Related Materials (ICSCRM), Lyon, France, October, 2003
24. Kelly Neely, Tze Yi Yeoh, **Kung-Yen Lee**, and Michael A. Capano, "*The Influence of Processing Steps on Reverse Biased Characteristics of 4H-SiC Schottky Barrier Diodes*," TMS, Electronic Materials Conference: Technical Program & Calendar of Events, Salt Lake City, Utah, June,

US Patent

US20100282289, Solar generator capable of power tracking and electric characteristic curve measurement and method for realizing the same

Honor

1. Technical program committee member for IEEE International Symposium on Power Semiconductor Devices and ICs (ISPSD) 2015-2020
2. Section Chair of IEEE ISPSD 2015
3. Reviewer for ICSCRM 2015
4. Reviewer of IEEE International Future Energy Electronics Conference (IFEEC) 2015 Chairman of Taiwan Power Semiconductors Workshop 2013
5. Reviewer of 2012 ARM Code-O-Rama Competition 2012
6. Section Chair of Taiwan Power Electronics Conference and Exhibition 2010, 2012 2014
7. Section Chair of Taiwan-Japan Symposium on Power Conversion 2012
8. Section Chair of Taiwan Wind Energy Conference 2010
9. The best Conference Paper of Taiwan Power Electronics Conference and Exhibition 2010
10. Section Chair of IEEE International Conference on Power Electronics and Drive Systems (PEDS) 2009
11. Section Chair of The 27th Symposium on Electrical Power Engineering
12. Reviewer of The 28th, 29th, 34th and 35th Symposium on Electrical Power Engineering
13. Committee and reviewer of IEEE International Conference on Electron Devices and Solid-state Circuits (EDSSC) 2007
14. The best Conference Paper of Taiwan Power Electronics Conference and Exhibition 2010
15. Reviewer for IET Microwaves, Antennas & Propagation
16. Reviewer for International Future Energy Electronics Conference, IFEEC 2013
17. Reviewer for Journal of Materials Research
18. Reviewer for International Journal of Nanotechnology
19. Reviewer for IEEE Electron Device Letters
20. Reviewer for IEEE Transactions on Electron Devices
21. Reviewer for IEEE Transactions on Industrial Electronics
22. Reviewer for IEEE Transactions on Power Electronics
23. Reviewer for Applied Mathematics & Information Sciences (AMIS)
24. Reviewer for International Journal of Electrical Engineering

Projects

1. Design of a low-speed direct-drive generator for Kuroshio (ocean current) energy around Taiwan
2. Energy saving of air conditioning systems utilizing solar PV energy
3. Accreditation of the small wind turbine and impact of high turbulence on the built-environment small wind turbine
4. Optimal design study of solar air conditioning system
5. A high pressure water electrolyzer for desktop and portable bifunction
6. Nondestructive evaluation for the foundation and surface of underwater pile
7. Electric vehicle maintenance equipment development project
8. Research on High Power Transistor structure
9. Ocean exploration-arrangement of high school and elementary school activities
10. Investigation of novel junction barrier Schottky diodes
11. Electric bus on green campus
12. Ocean energy project (intern project for students)
13. Investigation on SiC vertical and lateral MOSFET structures
14. Research on a high power contactless charger
15. Smart power ICs and high voltage semiconductor devices for photovoltaic power conversion

systems

16. Characterization and Research on Accelerated Lifetime Test of Power Switching Devices
17. Research on bi-directional DC/DC Li-ion battery charging and discharging technologies
18. Research on Refinement of Power Processors and Accelerated Life Test
19. Development of AC/DC bi-direction transformer for renewable energy
20. Integrated power control and management techniques
21. Design of photovoltaic power system
22. Development of MPPT control IC for the PV panel
23. Optimization of C-face 4H-SiC MOS-Capacitor performance
24. Research on hybrid electric motorcycle