Ts. Dr. Mohd Zamir bin Pakhuruddin

PERSONAL PROFILE

Director,
Institute of Nano Optoelectronics Research and Technology (INOR), Universiti Sains Malaysia, 11800 USM, Penang, Malaysia
E-mail: zamir@usm.my
Phone (Office): 04-6535638

Expertise: Photovoltaic Materials and Devices (PVMD)

ACADEMIC QUALIFICATION

PhD of Photovoltaics Engineering (2016)
Thesis: “Development of Light Trapping Schemes in Evaporated Laser-Crystallised Silicon Thin-Film Solar Cells on Glass Superstrates”
University of New South Wales (UNSW), Sydney, Australia

MSc of Physics (Research) (2012)
Thesis: “Thin Film Silicon Solar Cell Prepared by Thermal Evaporation on Polyimide Substrate”
Universiti Sains Malaysia (USM), Penang, Malaysia

BEng of Electrical Engineering (2003)
University of Sheffield, Sheffield, United Kingdom

CURRENT WORK EXPERIENCE (ACADEMIA)

Director (2022-Present)
Institute of Nano Optoelectronics Research and Technology (INOR), Universiti Sains Malaysia (USM), Penang, Malaysia

Senior Lecturer (2016-Present)
School of Physics, Universiti Sains Malaysia (USM), Penang, Malaysia

Industry Liaison: Osram Opto Semiconductors (2020-2021)
Universiti Sains Malaysia (USM), Penang, Malaysia

Industry-USM Collaboration Planning and Monitoring Committee (2020-2021)
Universiti Sains Malaysia (USM), Penang, Malaysia

AIxCHANGE: CEO@FACULTY Programme Focal Point (2019-2021)
Universiti Sains Malaysia (USM), Penang, Malaysia

Research Group Leader for Energy Studies (2017-2021)
School of Physics, Universiti Sains Malaysia (USM), Penang, Malaysia

Coordinator of Thermal Management Research Laboratory (2019-2021)
School of Physics, Universiti Sains Malaysia (USM), Penang, Malaysia

Acting Program Chairman for Applied Physics (February 2019-October 2019: 9 months)
School of Physics, Universiti Sains Malaysia (USM), Penang, Malaysia

Coordinator of Nano-Optoelectronics Research and Technology Laboratory (2017-2018)
School of Physics, Universiti Sains Malaysia (USM), Penang, Malaysia

PREVIOUS WORK EXPERIENCE (INDUSTRY) - 8 YEARS

Senior R&D Engineer (Sputtering) (2011-2012)
Fuji Electric (Malaysia) Sdn. Bhd., Kulim Hi-Tech Park, Kulim, Malaysia

Senior Photolithography Engineer (Equipment & Process) (2003-2009)
SilTerra Malaysia Sdn. Bhd., Kulim Hi-Tech Park, Kulim, Malaysia

PROFESSIONAL MEMBERSHIP

1. Professional Technologist (Green Technology: PT20120260), Malaysia Board of Technologists (MBOT), 2020-Present (National).
2. Companion Member (113079), The Institution of Engineers Malaysia (IEM), 2020-Present (National).
3. Graduate Engineer (Electrical Engineering: G1147954A), Board of Engineers Malaysia (BEM), 2017-Present (National).

TEACHING AND SUPERVISION

TEACHING

1. ZAT487/4 (2017-Present) - Semiconductor Fabrication Processes.
2. ZAT386/4 (2017-Present) - Physics of Semiconductor Devices.
3. ZCC593/8 (2019) - MSc Project (for MSc Solid State Physics).
4. ZAT394/8 (2018) - Applied Physics Project and Seminar (FYP).
5. ZCT293/2 (2017-Present) - Physics Practical.
6. ZCT294/2 (2017-Present) - Physics Practical.

SUPERVISION (POSTGRADUATE)

Graduated

1. Amer Neamah Jarad, “Synthesis and Characterization of Conductive Polyanilline Using 24 Hours Chemical Oxidative Process for Organic Solar Cells,” 2017, **Co-Supervisor, PhD**.
2. Idris Muhammad Sani, “Synthesis and Characterization of MgO and MgO/ZnO Multilayer Thin Films for Heat Spreading Application in Light Emitting Diode Packaging, Co-supervisor,” 2021, **Co Supervisor, PhD**.
3. Nur Afidah Md. Noor, “Synthesis and Characterization of Black Silicon by Silver-Assisted Chemical Etching for Solar Cell,” 2021, **Main Supervisor, MSc (Research).**
4. Mazalina Ahmad, “Silver Nanoparticles for Light Trapping in Textured Monocrystalline Silicon for Photovoltaics,” 2019, Main Supervisor, MSc Project.

5. Nourah Mohammed AlSaraawi, “Synthesis of Black Silicon by Metal-Assisted Chemical Etching for Photovoltaics,” 2018, Main Supervisor, MSc Project.

Active

1. Auwal Abdulkadir, “Fabrication and Characterization of Black Silicon for Heterojunction Solar Cells,” Main Supervisor, PhD **[Pending senate approval].**
2. Muhiddin Ahmad Sheriff, “Low-Cost Surface Passivation for Black Silicon Solar Cells by Liquid Phase Deposition Techniques,” Main Supervisor, PhD.
3. Shahnawaz Uddin, “Synthesis of Black Silicon by Aluminium-Assisted Chemical Etching for Photovoltaic Applications,” Main Supervisor, PhD.
4. Halo Dalshad Omar, “Flexible Black Silicon Fabricated by Silver-Assisted Chemical Etching for Solar Cells,” Main Supervisor, PhD.
5. Zulfa Zahri, “Elucidation of the Light-Trapping Mechanism in Ultrathin Perovskite Solar Cells with Rear Silver Nanoparticles,” Main Supervisor, PhD.
6. Baqandwan Hanadi Ahmed Yaslam, "Synthesis and Characterization of Flexible Lead-Free Perovskite Solar Cells", Main Supervisor, PhD.
7. Mohamad Aliff Asraff Rosle, "PEDOT:PSS Polymer-Based Heterojunction Emitter for Monocrystalline Silicon Solar Cells," Main Supervisor, MSc (Research).
8. Mimi Sofwana Saparuan, “Nano-Inverted Pyramids for Light Trapping in Silicon Solar Cells,” Main Supervisor, MSc (Research).
9. Bashir Yusuf, “Synthesis and Characterization of Molybdenum Oxide Doped with Graphene Oxides Thin Film by Spray Pyrolysis for Carrier Selective Contact on Silicon Based Solar Cell,” Co Supervisor, PhD.
10. Muheeb Ahmad Mousa Alkhalayfeh, “Enhanced Polymer Solar Cells Embedded with Plasmonic Nanoparticles,” Co Supervisor, PhD.
11. Hamza El Ladan Abdulkarim, “Synthesis and Investigation of AINB Composite Prepared by Stacking Method for LED,” Co Supervisor, PhD.
12. Sameen Aslam, "Titanium Halide Perovskites Solar Cells,” Co Supervisor, PhD.
13. Olaoye Abdulmutolib Olajide, “Fabrication and Characterization of Hybrid Colloidal SiC Quantum Dots/Nanostructured Si for Photovoltaic Applications,” Co Supervisor, PhD.

SUPERVISION (UNDERGRADUATE FINAL YEAR PROJECT)

Completed

1. Siti Sarah Hamil, "Development of Black Silicon for Solar Cells", 2018 (Main Supervisor).
2. Siti Khadijah Mohamad, "Development of Black Silicon for Solar Cells", 2018 (Main Supervisor).
3. Norfarhana Hamzah, "Simulation of Light-Trapping in Thin Crystalline Silicon Solar Cells", 2018 (Main Supervisor).
4. Nur Fitriah Rais, "Simulation of Light-Trapping in Thin Crystalline Silicon Solar Cells", 2018 (Main Supervisor).
5. Najah Amani Musaddad, "Analysis of Optical Losses in Thin Monocrystalline Silicon Solar Cells by Wafer Ray Tracer", 2019 (Main Supervisor).
6. Nur Arifa Isa, "Analysis of Optical Losses in Thin Monocrystalline Silicon Solar Cells by Wafer Ray Tracer", 2019 (Main Supervisor).
7. Arif Muhaimin Ariffin Mahidi, "Texturing of Cover Glass for Light-Trapping in Crystalline Silicon Solar Cells", 2019 (Main Supervisor).
8. Mohamad Aliff Asraff Rosle, "Texturing of Cover Glass for Light-Trapping in Crystalline Silicon Solar Cells", 2019 (Main Supervisor).
9. Radin Nursyamim Syafiqah Radin Sallehuddin, “Nano-Inverted Pyramids by Wet Chemical Etching for Improved Broadband Light Absorption in Monocrystalline Silicon for Photovoltaics”, 2020 (Main Supervisor).
10. Nuranis Liyana Muhamad Burhan, “Nano-Inverted Pyramids by Wet Chemical Etching for Improved Broadband Light Absorption in Monocrystalline Silicon for Photovoltaics”, 2020 (Main Supervisor).
11. Fazera Fadzil, "Silver Nanoparticles Integrated with Anti-Reflective Coating for Enhanced Light-Trapping in Monocrystalline Silicon for Photovoltaics", 2020 (Main Supervisor).
12. Izyan Syazwana Mohd Zakie, "Silver Nanoparticles Integrated with Anti-Reflective Coating for Enhanced Light-Trapping in Monocrystalline Silicon for Photovoltaics", 2020 (Main Supervisor).
13. Kaliraj A/L Pachiappan @ Arasu, "Simulation of Double Layer Anti-Reflective Coating on Thin Silicon Solar Cells by Ray Tracing", 2021 (Main Supervisor).
14. Goh Zong Ken, "Simulation of Double Layer Anti-Reflective Coating on Thin Silicon Solar Cells by Ray Tracing", 2021 (Main Supervisor).
15. Mohamad Noor Farez Rosli, "Simulation of Semi-Transparent Perovskite Absorber for Solar Windows by Ray Tracing”, 2021 (Main Supervisor).
16. Amirul Firdaus Bin Abdullah, "Simulation of Semi-Transparent Perovskite Absorber for Solar Windows by Ray Tracing", 2021 (Main Supervisor).

In Progress

1. Haziq bin Harun, “Simulation of organic solar cell with transparent contacts for solar windows”, 2022 (Main Supervisor).
2. Muhammad Zulhakimie bin Ahmad Zalani, “Simulation of organic solar cell with transparent contacts for solar windows”, 2022 (Main Supervisor).
3. Mohamad Fathul Bari bin Mohd Fuad, “Simulation of perovskite solar cell with transparent contacts for solar windows”, 2022 (Main Supervisor).
4. Najihah binti Rammely, “Simulation of perovskite solar cell with transparent contacts for solar windows”, 2022 (Main Supervisor).

RESEARCH AND PUBLICATION

RESEARCH GRANT

Principal Investigator

1. “Elucidation of the Light-Trapping Mechanism in Ultrathin Perovskite Solar Cells with Rear Silver Nanoparticles,” FRGS, RM122,500.00, 1/09/2019-30/11/2022 (Active).
2. “Development of Black Silicon for Solar Cells,” USM (Short-Term Grant), RM34,700, 1/8/2017-31/7/2019 (Completed).

Co-Researcher

1. “Elucidation of the Film Formation Mechanism and Optical Properties of Cs2TiX6 (X=I or Br) Perovskite Films as Potential Solar Cells Absorber,” FRGS, RM127,100, 1/11/2020 - 31/10/2023.
2. “Elucidation of the Charge Transport Mechanism in Perovskite Solar Cells with Zinc Oxide Quantum Dots Employed as Electron Transport Material,” FRGS, RM125,000, 1/1/2019-31/12/2021.
3. “Defect Passivation Effect via Modification of Charge Transport Mechanism in Tunnel Junction at Silicon-Perovskite Interface,” FRGS, RM67,200, 1/1/2019-31/12/2020.
4. “A Dual Approach of Experimental and Theoretical Studies on Donor-Pi-Acceptor Bridge Type Ferrocenyl Chalcones for Solar Cell Applications,” FRGS, RM94,340, 15/8/2017-14/8/2020.

5. “Epitaxial Growth of Indium-Rich InGaN Thin Films Using Metalorganic Chemical Vapour Deposition Technique,” USM (RU), RM69,000, 1/8/2020 - 31/7/2023.
6. “Battery Energy Storage System for Integration of Mass Clean Solar Energy into Power Grid to Enhance Energy Security in Malaysia,” USM (RU), RM70,000, 01/01/2020-30/06/2023.
7. “Fabrication and Characterisation of Silicon Carbide Quantum Dots,” USM (Short-Term Grant), RM35,465, 15/3/2018-14/3/2020.
8. “Epitaxial and Electrical Optimization of GaN based Resonant Tunneling Diodes through Physical Simulation, USM (RUI), RM94,670, 1/5/2018-30/4/2020.
9. “Thermally Efficient Polymer Substrates for Flexcircuits in Microelectronics Applications,” USM (RUI), RM124,700, 1/9/2018-31/8/2020.

PUBLICATION

1. Muheeb Ahmad Alkhalayfeh, Azlan Abdul Aziz, **Mohd Zamir Pakhuruddin**, Khadijah Mohammedsaleh M. Katubi, Neda Ahmadi, “Recent development of the indoor organic photovoltaics”, Physica Status Solidi A: Applications and Materials Science, 2100310 (2021) [Q3, IF = 1.981].
2. Muheeb Ahmad Alkhalayfeh, Azlan Abdul Aziz, **Mohd Zamir Pakhuruddin**, Khadijah Mohammedsaleh M. Katubi, “Spiky durian-shaped Au@Ag nanoparticles in PEDOT:PSS for improved efficiency of organic solar cells”, Materials **14**(19), 5591 (2021) [Q2, IF = 3.623].
3. Bashir Yusuf, Md. Roslan Hashim, **Mohd Zamir Pakhuruddin**, Mohd Mahadi Halim, “Effect of solution flow rate on the physical properties of spray pyrolyzed MoO_3 thin films as silicon-based heterojunction device”, Superlattices and Microstructures, https://doi.org/10.1016/j.spmi.2021.107111 (2021) [Q2, IF = 2.658].
4. Habib Ullah Manzoor, Mohamad Adzhar Md. Zawawi, **Mohd Zamir Pakhuruddin**, Sha Shiong Ng, Zainuriah Hassan, “High conversion and quantum efficiency indium-rich p-InGaN/p-InGaN/n-InGaN solar cell”, Physica B: Condensed Matter, 413339 (2021) [Q3, IF = 2.436].
5. Muheeb Ahmad Alkhalayfeh, Azlan Abdul Aziz, Khadijah Mohammedsaleh M. Katubi, **Mohd Zamir Pakhuruddin**, “Recent advances of perovskite solar cells embedded with

plasmonic nanoparticles", Physica Status Solidi A: Applications and Materials Science, 2100310 (2021) [Q3, IF = 1.981].

6. Shahnawaz Uddin, Md. Roslan Hashim, **Mohd Zamir Pakhuruddin**, "Effects of annealing temperature towards properties of black silicon fabricated by aluminium-assisted chemical etching", Materials Science in Semiconductor Processing **133**, 105932 (2021) [Q2, IF = 3.085].
7. Halo Dalshad Omar, Auwal Abdulkadir, Md. Roslan Hashim, **Mohd Zamir Pakhuruddin**, "Textured stainless steel foil as efficient rear reflector for flexible black silicon", Results in Physics **24,** 104203 (2021) [Q1, IF = 4.019].
8. Shahnawaz Uddin, Md. Roslan Hashim, **Mohd Zamir Pakhuruddin**, "Aluminium-assisted chemical etching for fabrication of black silicon", Materials Chemistry and Physics **265**, 124469 (2021) [Q2, IF = 3.408].
9. Muheeb Ahmad Alkhalayfeh, Azlan Abdul Aziz, **Mohd Zamir Pakhuruddin**, "An overview of enhanced polymer solar cells with embedded plasmonic nanoparticles", Renewable and Sustainable Energy Reviews **141**, 110726 (2021) [Q1, IF = 12.110].
10. Muheeb Ahmad Alkhalayfeh, Azlan Abdul Aziz, **Mohd Zamir Pakhuruddin**, "Enhancing the efficiency of polymer solar cells by embedding Au@Ag NPs Durian shape in buffer layer", Solar Energy **214**, 565-574 (2021) [Q2, IF = 4.608].
11. Halo Dalshad Omar, Md. Roslan Hashim, **Mohd Zamir Pakhuruddin**, "Surface morphological and optical properties of flexible black silicon fabricated by metal-assisted chemical etching", Optics & Laser Technology **136**, 106765 (2021) [Q1, IF = 3.233].
12. Auwal Abdulkadir, Azlan Abdul Aziz, **Mohd Zamir Pakhuruddin**, "Properties of indium tin oxide on black silicon after post-deposition annealing for heterojunction solar cells", Results in Physics **19**, 103405 (2020) [Q2, IF = 4.019].
13. Bashir Yusuf, Mohd Mahadi Halim, Md. Roslan Hashim, **Mohd Zamir Pakhuruddin**, "Structural, optical, and electrical properties of spray-pyrolyzed MoO3 thin films by varying precursor molarity, as hole-selective contact for silicon-based heterojunction devices", Journal of Materials Science: Materials in Electronics, https://doi.org/10.1007/s10854-020-04692-x (2020) [Q2, IF = 2.220].
14. Halo Dalshad Omar, Md. Roslan Hashim, **Mohd Zamir Pakhuruddin**, "Optimization of etching time for enhanced broadband absorption in flexible black silicon on stainless steel foil", Optik **225**, 165781 (2020) [Q2, IF = 2.187].

15. Halo Dalshad Omar, Md. Roslan Hashim, **Mohd Zamir Pakhuruddin**, “Ray tracing of inverted pyramids for light-trapping in thin crystalline silicon for solar cells”, Optik **219**, 165279 (2020) [Q2, IF = 2.187].
16. Auwal Abdulkadir, Azlan Abdul Aziz, **Mohd Zamir Pakhuruddin**, “Impact of micro-texturization on hybrid micro/nano-textured surface for enhanced broadband light absorption in crystalline silicon for application in photovoltaics”, Materials Science in Semiconductor Processing **105**, 104728 (2020) [Q2, IF = 2.722].
17. Marzaini Rashid, Naser M. Ahmed, Nur Afidah Md. Noor, **Mohd Zamir Pakhuruddin**, “Silicon quantum dot/black silicon hybrid nanostructure for broadband reflection reduction,” Materials Science in Semiconductor Processing **115**, 105113 (2020) [Q2, IF = 2.722].
18. Auwal Abdulkadir, Azlan Abdul Aziz, **Mohd Zamir Pakhuruddin**, “Effects of silver nanoparticles layer thickness towards properties of black silicon fabricated by metal-assisted chemical etching for photovoltaics”, SN Applied Sciences **2**, 515 (2020).
19. **Mohd Zamir Pakhuruddin**, “Ray tracing of light trapping schemes in thin crystalline silicon for photovoltaics,” Solid State Phenomena **301**, 183-191 (2020).
20. **Mohd Zamir Pakhuruddin**, “Investigation on light-trapping schemes in crystalline silicon thin-film solar cell on glass superstrate by ray tracer,” AIP Conference Proceedings **2203**, 020032 (2020).
21. Auwal Abdulkadir, Nur Afidah Md. Noor, Azlan Abdul Aziz, **Mohd Zamir Pakhuruddin**, “Ray tracing of light trapping schemes in thin crystalline silicon for photovoltaics,” Solid State Phenomena **301**, 167-174 (2020).
22. Nur Afidah Md Noor, Siti Khadijah Mohamad, Siti Sarah Hamil, Mutharasu Devarajan, **Mohd Zamir Pakhuruddin**, “Effects of annealing temperature towards surface morphological and optical properties of black silicon fabricated by silver-assisted chemical etching”, Materials Science in Semiconductor Processing **91**, 167-173 (2019) [Q2, IF = 2.593].
23. Nur Afidah Md Noor, Siti Khadijah Mohamad, Siti Sarah Hamil, Mutharasu Devarajan, **Mohd Zamir Pakhuruddin**, “Effects of etching time towards broadband absorption enhancement in black silicon fabricated by silver-assisted chemical etching”, Optik **176**, 586-592 (2019) [Q3, IF = 1.191].
24. Auwal Abdulkadir, Azlan Abdul Aziz, **Mohd Zamir Pakhuruddin**, “Optimization of etching time for broadband absorption enhancement in black silicon fabricated by one-step electroless silver-assisted wet chemical etching”, Optik **187**, 74-80 (2019) [Q3, IF = 1.191].

25. **Mohd Zamir Pakhuruddin**, Jialiang Huang, Jonathan Dore, Sergey Varlamov, “Rear texturing for light-trapping in laser-crystallised silicon thin-film solar cells on glass”, Solar Energy **166**, 213-219 (2018) [Q1, IF = 4.374].
26. **Mohd Zamir Pakhuruddin**, Jialiang Huang, Jonathan Dore, Sergey Varlamov, “Enhanced light-trapping in laser-crystallised silicon thin-film solar cells on glass by optimised back surface reflectors”, Solar Energy **150**, 477-484 (2017) [Q1, IF = 4.374].
27. **Mohd Zamir Pakhuruddin**, Jialiang Huang, Sven Kühnapfel, Jonathan Dore, Stefan Gall, Sergey Varlamov, “Properties of laser-crystallised silicon thin-film solar cells on textured glass”, Journal of Materials Science: Materials in Electronics **28**, 10391-10399 (2017) [Q2, IF = 2.324].
28. M. G. Faraj, **M. Z. Pakhuruddin**, P. Taboada, “Structural and optical properties of cadmium sulfide thin films on flexible polymer substrates by chemical spray pyrolysis technique”, Journal of Materials Science: Materials in Electronics **28**, 6628-6634 (2017) [Q2, IF = 2.324].
29. M. G. Faraj, **M. Z. Pakhuruddin**, P. Taboada, “Effects of substrate temperature on structural and optical properties of spray-pyrolyzed Cu(Ga0.3In0.7)Se2 thin films on polyimide plastic substrate”, Journal of Electronic Materials **46**, 6745-6749 (2017) [Q2, IF = 1.566].
30. **Mohd Zamir Pakhuruddin**, Jialiang Huang, Jonathan Dore, Sergey Varlamov, “Enhanced absorption in laser-crystallized silicon thin films on textured glass”, IEEE Journal of Photovoltaics **6**, 852-859 (2016) [Q1, IF = 3.075].
31. **Mohd Zamir Pakhuruddin**, Jialiang Huang, Jonathan Dore, Sergey Varlamov, “Light absorption enhancement in laser-crystallized silicon thin films on textured glass”, IEEE Journal of Photovoltaics **60**, 159-165 (2016) [Q1, IF = 3.075].
32. **Mohd Zamir Pakhuruddin**, Jonathan Dore, Jialiang Huang, Sergey Varlamov, “Effects of front and rear texturing on absorption enhancement in laser-crystallized silicon thin-films on glass”, Japanese Journal of Applied Physics **54**, 08KB04 (2015) [Q2, IF = 1.452].
33. M. G. Faraj, **M. Z. Pakhuruddin**, “Deposited lead sulfide thin films on different substrates with chemical spray pyrolysis technique”, International Journal of Thin Films Science and Technology **4**, 215-218 (2015).
34. M. Z. Mohd Yusoff, Z. Hassan, H. Abu Hassan, M. J. Abdullah, M. Rusop, **M. Z. Pakhuruddin**, AlxGa1−xN/GaN/AlN heterostructures grown on Si (111) substrates by MBE for MSM UV photodetector applications, Materials Science in Semiconductor Processing **34**, 214-223 (2015) [Q2, IF = 2.593].

35. **M. Z. Pakhuruddin**, K. Ibrahim, A. Abdul Aziz, “Studies of thermal annealing and optical transmission of PET plastic for applications in superstrate-oriented thin film silicon solar cells”, Optoelectronics and Advanced Materials – Rapid Communications **8**, 869-872 (2014) [Q3, IF = 0.390].
36. **M. Z. Pakhuruddin**, K. Ibrahim, A. Abdul Aziz, “Thermally evaporated thin film microcrystalline silicon solar cells on polyimide substrate with multiple light trapping schemes”, Optoelectronics and Advanced Materials – Rapid Communications **8**, 255-259 (2014) [Q3, IF = 0.390].
37. P. C. Ang, K. Ibrahim, **M. Z. Pakhuruddin**, "Characterizations of electron beam evaporated silicon thin films on plastic substrates for solar cells applications", Advanced Materials Research **925**, 543-547 (2014) [Q4, IF = 0.120].
38. **M. Z. Pakhuruddin**, Y. Yusof, K. Ibrahim, A. Abdul Aziz, “Fabrication and characterization of zinc oxide anti-reflective coating on flexible thin film microcrystalline silicon solar cell”, Optik - International Journal for Light and Electron Optics **124**, 5397-5400 (2013) [Q3, IF = 1.191].
39. **M. Z. Pakhuruddin**, K. Ibrahim, A. Abdul Aziz, “Properties of polyimide substrate for applications in flexible solar cells”, Optoelectronics and Advanced Materials – Rapid Communications **7**, 377-380 (2013) [Q3, IF = 0.390].
40. **M. Z. Pakhuruddin**, K. Ibrahim, A. A. Aziz, "Properties of aluminium thin films on polyimide plastics as back contacts in thin film silicon solar cells", Advanced Materials Research **620**, 474-479 (2013) [Q4, IF = 0.120].
41. S. Varlamov, J. Dore, R. Evans, D. Ong, B. Eggleston, O. Kunz, U. Schubert, T. Young, J. Huang, T. Soderstrom, K. Omaki, K. Kim, A. Teal, M. Jung, J. Yun, **Z. M. Pakhuruddin**, R. Egan, M. A. Green, “Polycrystalline silicon on glass thin-film solar cells: A transition from solid-phase to liquid-phase crystallised silicon”, Solar Energy Materials & Solar Cells **119**, 246-255 (2013) [Q1, IF = 5.018].
42. **M. Z. Pakhuruddin**, K. Ibrahim, A. A. Aziz, "Properties of aluminium thin films on polyethylene terephthalate substrates as back contacts in thin film silicon solar cells", International Journal of Polymeric Materials **61**, 669-678 (2012) [Q2, IF = 2.127].
43. M. K. Mohammed Ali, K. Ibrahim, **M. Z. Pakhuruddin**, M. G. Faraj, "Optical and electrical properties of indium tin oxide (ITO) thin films prepared by thermal evaporation method on polyethylene terephthalate (PET) substrate", Advanced Materials Research **545**, 393-398 (2012) [Q4, IF = 0.120].

44. M. K. M. Ali, K. Ibrahim, E. M. Mkawi, **M. Z. Pakhuruddin**, "Surface morphology and structural properties of silver thin films prepared on polyethylene terephthalate (PET) substrate by screen printing technique", Advanced Materials Research **364**, 110-114 (2012) [Q4, IF = 0.120].
45. **M. Z. Pakhuruddin**, K. Ibrahim, A. Abdul Aziz, “Effects of different TMAH texturing conditions towards morphology and surface reflectivity of monocrystalline silicon for solar cells applications”, Optoelectronics and Advanced Materials – Rapid Communications **5**, 16-21 (2011) [Q3, IF = 0.390].
46. **M. Z. Pakhuruddin**, K. Ibrahim, A. Abdul Aziz, “Electrical characterisations and surface morphologies of thermally evaporated thin film silicon on plastic substrates for solar cells applications”, Optoelectronics and Advanced Materials – Rapid Communications **4**, 1534-1537 (2010) [Q3, IF = 0.390].
47. M. G. Faraj, K. Ibrahim, M. H. Eisa, M. K. M. Pakhuruddin, **M. Z. Pakhuruddin**, “Comparison of zinc oxide thin films deposited on the glass and polyethylene terephthalate substrates by thermal evaporation technique for applications in solar cells”, Optoelectronics and Advanced Materials – Rapid Communications **4**, 1587-1590 (2010) [Q3, IF = 0.390].

OTHERS

AWARD

1. Best Video Award (Energy), International FBERG Colloquium: Energy and Advanced Materials, 2021.
2. Hadiah Sanjungan (Journal Publication) - H05006, Universiti Sains Malaysia (USM), 2020.
3. Hadiah Sanjungan (Journal Publication) - H05008, Universiti Sains Malaysia (USM), 2020.
4. Hadiah Sanjungan (Journal Publication) - H04654, Universiti Sains Malaysia (USM), 2019.
5. Hadiah Sanjungan (Journal Publication) - H04657, Universiti Sains Malaysia (USM), 2019.
6. Hadiah Sanjungan (Journal Publication) - H04154, Universiti Sains Malaysia (USM), 2018.
7. Hadiah Sanjungan (Journal Publication) - H04155, Universiti Sains Malaysia (USM), 2018.
8. Hadiah Sanjungan (Journal Publication) - H04156, Universiti Sains Malaysia (USM), 2018.
9. University Academic Staff Training Scheme Fellowship (KPT & USM) (2009-2011 for MSc, 2012-2016 for PhD).
10. Travel Grant by UNSW for collaboration work at Hemholtz Zentrum Berlin (HZB), Berlin, 2015.

11. Travel Grant by UNSW for 6th World Conference on Photovoltaic Energy Conversion, Kyoto, 2014.
12. SilTerra Innovation Celebration Week, Winner for Operational Efficiency – Technical Category, 2006.

KEYNOTE AND INVITED SPEAKER

1. Guest Lecture 2: "Manufacturing of Silicon Solar Cells", Universitas Airlangga, Surabaya, Indonesia, DECOTA Program, 15 November 2021 (Virtual Platform).
2. Guest Lecture 1: "Introduction to Solar Cells", Universitas Airlangga, Surabaya, Indonesia, DECOTA Program, 26 October 2021 (Virtual Platform).
3. Invited Speaker: “Ray tracing of thin PERC silicon solar cells with cone textures”, International Conference on Advancement in Materials, Manufacturing and Devices (ICAMADE 2021), 22 June 2021, UNIMAP, Malaysia (Virtual Platform).
4. Keynote Speaker: “Light Trapping in Silicon Solar Cells”, 1st International Conference on Advanced Research in Pure and Applied Science (ICARPAS 2021), 24-25 March 2021, Al-Muthanna University, Iraq (Virtual Platform).
5. Invited Lecture: “Solar Cells”, 20 February 2021, Teesside University, United Kingdom (Virtual Platform).
6. Invited Speaker: “Photovoltaic Technology”, Half-Day Seminar on Photovoltaic Technology, The Institution of Engineers Malaysia (IEM), 15 August 2020, Penang, Malaysia.
7. Invited Speaker: “Investigation on Light-Trapping Schemes in Crystalline Silicon Thin-Film Solar Cell on Glass Superstrate by Ray Tracer”, 2nd International Conference on Applied Photonics and Electronics (InCAPE 2019), 22-23 August 2019, UNIMAP, Putrajaya, Malaysia.

JOURNAL REVIEWER

1. Nanoscale, RSC (2021-Present)
2. Energies, MDPI (2021-Present)
3. ACS Applied Energy Materials, ACS (2021-Present)
4. IEEE Photonics Technology Letters, IEEE (2016-Present)
5. Applied Surface Science, Elsevier (2018-Present)
6. Applied Surface Science Advances, Elsevier (2020-Present)
7. Nano-Structures and Nano-Objects, Elsevier (2021-Present)

8. Journal of Solid-State Science and Technology, ECS (2018-Present)
9. Results in Physics, Elsevier (2019-Present)
10. Heliyon, Elsevier (2018-Present)
11. Measurement and Control, SAGE (2018-Present)
12. Journal of Physical Science, USM (2017-Present)
13. Sains Malaysiana, UKM (2017-Present)
14. International Journal of Electroactive Materials, UITM (2020-Present)

REFEREE

Professor Dr. Abdul Razak bin Ibrahim,
Dean,
School of Physics,
Universiti Sains Malaysia (USM),
11800 Minden, Penang.
E-mail: arazaki@usm.my