

## CURRICULUM VITEA (CV)

### 1. PERSONAL DATA

Name : Norzaini Zainal  
Nationality : Malaysian  
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ORCID : <https://orcid.org/0000-0003-1306-2828>  
Current Position : Researcher/Lecturer DS54  
Qualifications : PhD  
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### 2. ACHIEVEMENTS

On going grants :  
1. Fundamental Research Grant Scheme (FRGS), 2016-2019  
    • Amount awarded: RM 164,000.00  
2. Research University Grant (RUI) 2018-2021  
    • Amount awarded: RM 90,000.00

Completed grants :  
1. MOSTI E-Science Fund, 2015  
2. Exploratory Research Grant Scheme (ERGS) 2013  
3. Research University Grant (RUI) 2012  
4. Apex Delivering Excellence 2012  
5. Fundamental Research Grant Scheme (FRGS)  
6. TWAS Research Grant Programme  
7. USM Short Term Grant  
8. USM Incentive Grant

Graduated students : 1 PhD and 5 MSc

Postgraduate Under supervision : 5 PhD 1 MSc

Publications : 47

Patents/ Copyrights/ Filing : PI 2017702866: Method of producing a freestanding bulk polycrystalline Gallium Nitrides substrate.

- Achievements/Awards / Recognitions :
1. 2016 SSLEEC Visiting Researcher Appreciation Award from University of California, Santa Barbara
  2. Anugerah Sanggar Sanjung 2015-awarded by Universiti Sains Malaysia
  3. Recognized Reviewer Status- Materials Science in Semiconductor Processing, 2014, Elsevier, The Netherlands
  4. Bronze Medal winner at Innovation Platform 2014-awarded by UiTM Pulau Pinang
  5. Recognized Reviewer Status- Applied Surface Science, 2013, Elsevier, The Netherlands
  6. Bronze Medal winner at Innovation Platform 2013-awarded by UiTM Pulau Pinang
  7. Hadiah Sanjungan 2011 - awarded by Universiti Sains Malaysia
  8. Travel Prize Awards 2009 – awarded by University of Nottingham
  9. Academic Staff Training Skill (ASTS) scholarship (2007-2010) - awarded by Universiti Sains Malaysia and Malaysian Ministry of Higher Education
  10. Hadiah Sanjungan 2006 - awarded by Universiti Sains Malaysia

### 3. CURRENT RESEARCHS AND PAST RELATED RESEARCHS:

- 2016-now Growth of longer wavelength  $\text{In}_x\text{Ga}_{1-x}\text{N}$  based light emitting diode (LED)
- 2010-2016 Growth of non-polar GaN for high efficient light emitting diode (LED)
- 2007-2010 Study of cubic GaN and cubic III-V nitride based Resonant Tunneling Diode (RTD)
- 2004-2006 Simulation on III-V nitrides based light emitting diode (LED)

### 4. ACADEMIC RECOGNITION

1. Editorial member for The International Journal of Nanoelectric and Materials (IJNeaM) (2017-2019)
2. Key member for USM-CREST partnership for GaN on GaN Program (2015-2020)
3. Manuscript Reviewer, ECS Journal (2018).
4. Manuscript Reviewer, Indian Journal of Physics (2018).
5. Manuscript Reviewer, Scientific Report by Nature (2018).
6. Manuscript Reviewer, Applied Surface Science, (2017)
7. Manuscript Reviewer, Journal of Alloys and Compound, (2017)
8. Manuscript Reviewer, Materials Science in Semiconductor Processing, (2017).
9. Visiting Researcher in Semiconductor and Material Spectroscopy Group at King Abdullah University of Science and Technology (KAUST) (2017).
10. Manuscript Reviewer, Applied Surface Science, (2016)
11. Visiting Researcher in the Materials Department at University of California, Santa Barbara (UCSB), (2016).
12. Manuscript Reviewer, Surface and Coating Technology (2015).
13. Manuscript Reviewer, Materials Science in Semiconductor Processing, (2015).
14. Manuscript Reviewer, Solid State Electronics, (2015).
15. Manuscript Reviewer, Superlattices and Microstructures, (2014).
16. Manuscript Reviewer, Materials Science in Semiconductor Processing, (2014).
17. Manuscript Reviewer, Journal of Thermophysics and Heat Transfer, (2014).
18. Manuscript Reviewer, Applied Surface Science, (2013).
19. Manuscript Reviewer, Journal of Taibah University for Science, (2013).
20. Manuscript Reviewer, Colloids and Surfaces A, (2013).
21. Manuscript Reviewer, Advanced Material Research, (2013).
22. Invited speaker for International Post-Graduate Course on Current Research in Physics (2013)
23. Invited speaker for Workshop on Fabrication and Advanced Characterization Methods for Nanomaterials (2012)
24. Invited speaker for Workshop on Fabrication and Advanced Characterization Methods for Nanomaterials (2012)
25. Reviewer for Short-Term Grant (USM level)
26. Internal examiner for 1 PhD thesis and 3 MSc thesis
27. External examiner for 3 MSc thesis

## 5. RESEARCH PUBLICATIONS:

### Journals

1. Alvin Yong Shee Meng, Muhammad Esmad Alif Samsudin, Muhamad Ikram Md Taib, Zainuriah Hassan, Norzaini Zainal, (2019), 'Improving polycrystalline GaN by controlling annealing temperature of ScN interlayer', *Material Research Express*, **6** 066403 [Impact factor: 1.566]
2. M. Ikram Md Taib, M.E.A Samsudin, E.A Alias, S.N Waheeda, N. Ibrahim, A. Shuhaimi, N. Zainal, (2019) 'Surface and optical characteristics of polycrystalline GaN layer with different pores profile of porous GaAs/GaAs substrate' *Material Research Express* **6** 085906 [Impact factor: 1.566]
3. M. Ikram Md Taib, N. Munirah, S.N. Waheeda, A. Shuhaimi, S.N. Sabki, N. Zainal, (2019), 'Improving Material Quality of Polycrystalline GaN by Manipulating the Etching Time of a Porous AlN Template', *Journal of Electronic Materials*, <https://doi.org/10.1007/s11664-019-07107-8>. [Impact factor: 2.593]
4. N. Zainal, M.E.A Samsudin, Muhamad Ikram Md Taib, M.A. Ahamd, A. Ariff, N. Alwadai, I.S. Roqan, (2018), 'Freestanding patterned polycrystalline GaN substrate by a straightforward and affordable technique', *Materials Science in Semiconductor Processing* **88** 40-44. [Impact factor: 2.593]
5. M.E.A Samsudin, M. Ikram Md Taib, E. Alias, S.N. Waheeda, A. Ariff, M.A. Ahmad, N. Zainal, (2018), 'Processing and Characterization of a free-standing bulk polycrystalline GaN layer', *Journal of Alloys and Compounds* **769** 161-166. [Impact factor: 3.779]
6. A. Ariff, N. Zainal, Z Hassan, (2018), 'Influence of ammonia flow rate for improving properties of polycrystalline GaN', *Superlattices and Microstructure* **118** 130-136. [Impact factor: 2.090]
7. Mohd Nazri Abd Rahman, Ahmad Shuhaimi, Yusnizam Yusuf, Hongjian Li, Abdullah Fadil Sulaiman, Muhammad Esmad Alif Samsudin, Norzaini Zainal, Muhammad I.M. Abdul Khudus, (2018), 'Standard pressure deposition of crack-free AlN buffer layer grown on c-plane sapphire by PALE technique via MOCVD', *Superlattices and Microstructure* **120** 319-326. [Impact factor: 2.090]
8. Adreen Azman, Ahmad Shuhaimi, Al-Zuhairi Omar, Anas Kamarundzaman, Muhammad Imran Mustafa Abdul Khudus, Azharul Ariff, MEA Samsudin, Norzaini Zainal, Saadah Abd Rahman, (2018), 'Metal organic chemical vapor deposition of m-plane GaN epi-layer using a three-step approach towards enhanced surface morphology', *Thin Solid Films* **667** 48-54. [Impact factor: 1.939]
9. A.S. Yusof, Z. Hassan, N. Zainal, (2018), 'Fabrication and characterization of copper doped zinc oxide by using Co-sputtering Technique', *Materials Research Bulletin* **97** 314-318. [Impact factor: 2.873]
10. M.E.A. Samsudin, N. Zainal, Z. Hassan, (2017), 'Deposition of a polycrystalline GaN layer on a porous Si/Si substrate by an electron beam evaporator with a successive ammonia annealing treatment', *Journal of Alloys and Compounds* **690** 397-402. [Impact factor: 3.014]
11. Mahmoud Alimanesh, Z. Hassan, Norzaini Zainal (2017), 'Electrochemical growth of controlled tip shapes of ZnO nanorod arrays on silicon substrate and enhanced photoluminescence emission from nanopyramid arrays compared with flat-head nanorods', *Optical Materials* **72** 276-282. [Impact factor: 2.023]
12. A Ariff, N. Zainal, Z Hassan, (2016), 'Annealing effects on polycrystalline GaN using nitrogen and ammonia ambients', *Superlattices and Microstructure* **97** 193-201. [Impact factor: 2.117]
13. M. Ikram Md Taib, N. Zainal, Z. Hassan, M. Abu Bakar, (2016), 'Behavior of Etching Process on Formation of Porous Polycrystalline GaN Layer through Electroless Etching', *ECS Journal of Solid State Science and Technology* **5** (10), P584-P589. [Impact factor: 1.558]
14. HJ Quah, NM Ahmed, N. Zainal, FK Yam, Z Hassan, WF Lim, (2016), 'Room temperature hydrogen gas sensing characteristics of porous quaternary AlInGa film prepared via UV-assisted photo-electrochemical etching', *Superlattices and Microstructures* **95** 65-70. [Impact factor: 2.117]

15. WF Lim, HJ Quah, Z Hassan, R Radzali, N Zainal, FK Yam, (2016), 'Porous Quaternary  $\text{Al}_{0.1}\text{In}_{0.1}\text{Ga}_{0.8}\text{N}$  Film Formation via Photoelectrochemical Etching in  $\text{HF}:\text{C}_2\text{H}_5\text{OH}$  Electrolyte', *Journal of the American Ceramic Society* **99** 2395. [Impact factor: 2.787]
16. HJ Quah, WF Lim, Z Hassan, FK Yam, N Zainal, (2016), 'Structural and optical investigation of porous quaternary  $\text{Al}_{0.10}\text{In}_{0.10}\text{Ga}_{0.80}\text{N}$  films produced via ultraviolet-assisted photo-electrochemical etching in acidic solutions', *Journal of Alloys and Compounds* **662** 32-43. [Impact factor: 3.014]
17. Way Foong Lim, Hock Jin Quah, Zainuriah Hassan, Rosfariza Radzali, Norzaini Zainal, Fong Kwong Yam, (2015), 'Alteration of structural and optical properties in quaternary  $\text{Al}_{0.1}\text{In}_{0.1}\text{Ga}_{0.8}\text{N}$  films using ultraviolet assisted photo-electrochemical etching route', *Journal of Alloys and Compounds* **649** 337-347. [Impact factor: 3.014]
18. R. Radzali, Z. Hassan, N. Zainal, F.K. Yam, (2015), 'Preparation of porous  $\text{InAlGaN/Si}$  (1 1 1) by photoelectrochemical etching for high performance hydrogen gas sensors at room temperature', *Sensors and Actuator B* **213** 276-284. [Impact factor: 4.758]
19. Alvin Yong Shee Meng, Norzaini Zainal, Zainuriah Hassan, Kamarulazizi Ibrahim, (2015), 'Formation of scandium nitride (ScN) layer on gallium arsenide (GaAs) substrate using a combined technique of e-beam evaporator and ammonia annealing treatment' *Applied Surface Science* **359** 589-592. [Impact factor: 3.150]
20. Hock Jin Quah, Way Foong Lim, Zainuriah Hassan, Rosfariza, Norzaini Zainal, Fong Kwong Yam (2015), 'Effects of ultraviolet-assisted electrochemical etching current densities on structural and optical characteristics of porous quaternary  $\text{AlInGaN}$  alloys', *Arabic Journal of Chemistry-In press* <http://doi.org/10.1016/j.arabjc.2015.10.003>. [Impact factor: 3.613]
21. Ezzah A Alias, N. Zainal, Ahmad Shuhaimi, Z. Hassan, (2015), 'Effect of using two-step thermal annealing with different ambient gas on Mg activation and crystalline quality in GaN', *Superlattices and Microstructures* **82** 592-598. [Impact factor: 2.117]
22. Ezzah A Alias, N. Zainal, Ahmad Shuhaimi, Z. Hassan, (2015), 'Thermal annealing effects on the properties of MBE-GaN p-n junction', *Journal of Physical Science* **26** 35-42. [Impact factor: N/A]
23. S.N. Waheeda N. Zainal, Z. Hassan, (2015), 'Role of pre-annealing treatment in improving the porosity of gallium nitride on cubic silicon (100) substrate', *Materials Science in Semiconductor Processing* **30** 330-334. [Impact factor: 2.264]
24. R. Radzali, Z. Hassan, N. Zainal, F.K. Yam, (2015), 'Structural and optical characteristics of porous  $\text{InAlGaN}$  prepared by photo-electrochemical etching', *Journal of Alloys and Compounds* **622** 565-571. [Impact factor: 3.014]
25. N. Zainal, E. Azimah, Z. Hassan, H. Abu Hassan, M.R. Hashim, (2014), 'Simulation on the Roles of the Number of Quantum Well and Doping in  $\text{In}_x\text{Ga}_{1-x}\text{N}$  Multiple Quantum Wells LEDs', *Sains Malaysiana* **43** 1557-1564. [Impact factor: 0.350]
26. S.N. Waheeda N. Zainal, Z. Hassan, S.V. Novikov, A.V. Akimov A.J. Kent, (2014), 'Low fraction of hexagonal inclusions in thick and bulk cubic GaN layers', *Applied Surface Science* **317** 1010-1014. [Impact factor: 3.150]
27. Muhamad Ikram Md Taib, Norzaini Zainal, and Zainuriah Hassan, (2014), 'Improvement of Porous GaAs (100) Structure through Electrochemical Etching Based on DMF Solution', *Journal of Nanomaterials* **2014** Article ID 294385. [Impact factor: 1.758]
28. R. Radzali, Z. Hassan, N. Zainal, F.K. Yam, (2014), 'Nanoporous  $\text{InGaN}$  prepared by KOH electrochemical etching with different light sources', *Microelectronics Engineering* **126** 107-112. [Impact factor: 1.277]
29. M.E.A. Samsudin, N. Zainal, Z. Hassan, (2014), 'Controlled porosity of GaN using different pore size of Si (100) substrates', *Superlattices and Microstructures* **73** 54-59. [Impact factor: 2.117]
30. Y.S.M. Alvin, N. Zainal, Z. Hassan, (2014), 'Fabrication of porous aluminium nitride films on silicon substrate for a better overgrown layer', *Materials Research Innovations* **18** S6-375. [Impact factor: 0.473]

31. R. Radzali, N. Zainal, F.K. Yam, Z. Hassan, (2014), 'Characteristics of porous GaN prepared by KOH photoelectrochemical etching', *Materials Research Innovations* **18** S6-375. [Impact factor: 0.473]
32. S.C. Lee, S.S. Ng, H. Abu Hassan, Z. Hassan, N. Zainal, S.V. Novikov, C.T. Foxon, A.J. Kent, (2014), 'Polarized infrared reflectance study of free standing cubic GaN grown by molecular beam epitaxy', *Materials Chemistry and Physics* **146** 121-128. [Impact factor: 2.101]
33. R. Radzali, N. Zainal, F.K. Yam, Z. Hassan, (2013), 'Nanoporous InGaN of high In composition prepared by KOH electrochemical etching', *Materials Science in Semiconductor Processing* **16** 2051-2057. [Impact factor: 2.264]
34. E. Azimah, N. Zainal, Z. Hassan, A. Shuhaimi, A. Bahrin, (2013), 'Electrical and Optical Characterization of Mg doping in GaN', *Advanced Materials Research* **620** 453-457. [Impact factor: 0.230]
35. Mahmoud Alimanesh, Jalal Rouhi, N. Zainal, Saeid Kakooei, Z. Hassan, (2013), 'Growth of Vertically Aligned ZnO Nanorods Arrays by Hydrothermal Method', *Advanced Materials Research* **795** 616-619. [Impact factor: 0.230]
36. M.E.A. Samsudin, M. Ikram Md Taib, N. Zainal, R. Radzali, S. Yaakob, Z. Hassan, (2013), 'Preparation of Porous Si (100) for Overgrown Cubic Layer: Morphological Investigation', *Sains Malaysiana* **42**, 1333-1337. [Impact factor: 0.350]
37. Rosfariza Radzali, Mohd Anas Ahmad, Zainuriah Hassan, Norzaini Zainal, Yam Fong Kwong, Chin Che Woei, Mohd Zaki Mohd Yusoff, Siti Khadijah Mohd. Bakhori and Yushamdan Yusof, (2012), 'Characterization of GaN p-n junction Grown on Si (111) Substrate by Plasma-Assisted Molecular Beam Epitaxy', *Advanced Materials Research* **364** 139-143. [Impact factor: 0.230]
38. N. Zainal, S.V. Novikov, A.V. Akimov, C.R. Staddon, C.T. Foxon, A.J. Kent, (2011), 'Hexagonal (wurtzite) GaN inclusions as a defect in cubic (zinc-blende) GaN', *Physica B* **407** 2964-2966. [Impact factor: 1.352]
39. N. Zainal, S. V. Novikov, C. J. Mellor, C. T. Foxon, and A. J. Kent, (2010), 'Current-voltage characteristics of zinc-blende (cubic)  $Al_{0.3}Ga_{0.7}N/GaN$  double barrier resonant tunneling diodes', *Applied Physics Letters* **97** 112102 - 112102-3. [Impact factor: 3.142]
40. S.V. Novikov, N. Zainal, A.V. Akimov, C.R. Staddon, A.J. Kent, C.T. Foxon, (2010), 'Molecular Beam Epitaxy as a method for the growth of freestanding zinc-blende (cubic) GaN layers and substrates', *Journal of Vacuum Science and Technology B* **28** C3B1-C3B6. [Impact factor: 1.398]
41. N. Zainal, P. Walker, A.J. Kent, (2010), 'Modelling of Cubic  $Al_xGa_{1-x}N$  GaN Resonant Tunnel Diode Structures', *Physica Status Solidi (c)* **7** 2262-2264. [Impact factor: N/A]
42. S.V. Novikov, N. Zainal, C.T. Foxon, A.J. Kent, F. Luckert, P.R. Edwards, R.W. Martin, (2010), 'Study of unintentional arsenic incorporation into free-standing zinc-blende GaN and AlGaIn layers grown by molecular beam epitaxy on GaAs substrates', *Physica Status Solidi (c)* **7** 2033-2035. [Impact factor: N/A]
43. D. Moss, A.V. Akimov, S.V. Novikov, R.P. Campion, C.R. Staddon, N. Zainal, C.T. Foxon, A.J. Kent, (2009), 'Elasto-optical properties of zinc-blende (cubic) GaN measured by picosecond acoustics', *Journal of Physics D: Applied Physics* **42** 115412-115415. [Impact factor: 2.772]
44. S.V. Novikov, C.R. Staddon, A.V. Akimov, R.P. Campion, N. Zainal, A.J. Kent, C.T. Foxon, C.H. Chen, K.M. Yu and W. Walukiewicz, (2009), 'Molecular beam epitaxy of crystalline and amorphous GaN layers with high As content', *Journal of Crystal Growth* **311** 3417-3422. [Impact factor: 1.462]
45. S.V. Novikov, C.R. Staddon, A.V. Akimov, R.P. Campion, N. Zainal, A.J. Kent, C.T. Foxon, C.H. Chen, K.M. Yu and W. Walukiewicz, (2009), 'Growth by molecular beam epitaxy of GaNAs alloys with high As content for potential photoanode applications in hydrogen production', *Materials Research Society Symposium Proceedings* **1167** 1167-004-07. [Impact factor: N/A]

46. N. Zainal, Z. Hassan, H. Abu Hassan, M. R. Hashim, (2007), 'Comparative study of single and multiple quantum wells of In<sub>0.13</sub>Ga<sub>0.87</sub>N based LED by simulation method', *Optoelectronics and Advanced Materials-Rapid Communications* **1** 404-407. [Impact factor: 0.380]
47. N. Zainal, H. Abu Hassan, Z. Hassan, M.R. Hashim, N.M. Ahmed, (2006), 'Optimization of InGaN based light emitting diodes', *Materials Science Forum* **517** 195-201. [Impact factor: 0.280]
48. Z. Hassan, Y.C. Lee, F.K. Yam, Z.J. Yap, N. Zainal, H. Abu Hassan, K. Ibrahim, (2004), 'Thermal stability of Ni/Ag contacts on p-type GaN', *Physica Status Solidi (c)* **1** 2528-2532. [Impact factor: N/A]

## 6. REFEREES:

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Name : Prof. Dr. Anthony Kent  
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