



**Dr. Md. Rafiqul Islam**  
Professor

**Research Area** Power System: Load flow, voltage and frequency control, Fault analysis Multi-junction solar cells (performed simulation). Compound semiconductor based devices (modeling, numerical simulation etc), Nano technologies Thin films solar cells: Growth (MOVPE), processing technology and device fabrication (used SEM, XRD, Hall measurement, PL, AFM, IV, CV, EB evaporation, Wet chemical etching). Fabrication of solar cells (used epitaxial doping process).

## Education

### Doctor of Engineering

University of Fukui, Japan (2007-2010)

**Thesis Title:** [Growth and Characterization of MOVPE InxGa1-xN \(x = 0 ~ 0.4\) for Solar Cells](#)

### MSc in EEE

Khulna University of Engineering & Technology, Bangladesh (2002-2006)

**Thesis Title:** [Design of High Efficiency InxGa1-xN-Based Multi-Junction Solar Cells](#)

### BSc in EEE

Bangladesh University of Engineering & Technology, Bangladesh (1991-1998)

### HSC

Satkuira Government College, Bangladesh (1989-1991)

### SSC

Dhandia Union Institution, Bangladesh (1987-1989)

## Service Records

- **Professor (Grade 1)**  
**Department/Section:** EEE  
**Khulna University of Engineering & Technology** From 08-12-2020 to 01-01-1970
- **Professor (2nd Grade)**  
**Department/Section:** EEE  
**Khulna University of Engineering & Technology** From 13-09-2016 to 07-12-2020
- **Professor**  
**Department/Section:** EEE  
**Khulna University of Engineering & Technology** From 13-09-2012 to 12-09-2016
- **Associate Professor**  
**Department/Section:** EEE  
**Khulna University of Engineering & Technology** From 29-03-2011 to 12-09-2012
- **Assistant Professor**  
**Department/Section:** EEE  
**Khulna University of Engineering & Technology** From 15-06-2003 to 28-03-2011
- **Lecturer**  
**Department/Section:** EEE  
**Khulna University of Engineering & Technology** From 15-10-2001 to 14-06-2002
- **Assistent Engineer**  
**Department/Section:** Operation Department  
**BPDB** From 12-03-2000 to 07-10-2001  
Working Area: Power Station
- **System Support Engineer**  
**Spectra Solutions Ltd.** From 14-03-1999 to 10-03-2000

## Research Interest

**Power System: Load flow, voltage and frequency control, Fault analysis**

**Multi-junction solar cells (performed simulation). Compound semiconductor based devices (modeling, numerical simulation etc), Nano technologies**

**Thin films solar cells: Growth (MOVPE), processing technology and device fabrication (used SEM, XRD, Hall measurement, PL,**

## Publication

---

### Books

1. Karim, N., Meme, F. I. and Islam, R. I. (2017), **Organic Tandem Solar Cells: Approach to High Efficiency**, ISBN:978-620-2-05042-5, Lap Lambert Academic Publishing

### Journals

45. Barma, S., Khan, M. S. H., Islam, R. I. and Hasan, M. T. (2023), "Intra-layer Spatial Carrier Separation Capability for Visible Light Driven Photocatalytic Properties of SnGe<sub>2</sub>N<sub>4</sub>-Layered Nanostructure: A First-Principles Study," **AIP Advances**
44. As-Samee, M. T. A., Khan, M. S., Kubra, K., Islam, R. I. and Hasan, M. T. (2023), "Tunable Electronic and Optical Properties of GeC/PtO<sub>2</sub> vdW Hetero-bilayer using First-principles Study," **AIP Advances**, AIP, vol13, no.065004
43. Alam, M., Khan, M. S., Islam, R. I. and Hasan, M. T. (2022), "Bandgap Engineering in BP/PtO<sub>2</sub> van der Waals (vdW) Hetero-bilayer using First-principles Study," **AIP Advances**, AIP Publishing, vol12, no.9, pp. 095312
42. Kubra, K., Islam, R. I., Khan, M. S. H., Islam, M. S. and Hasan, M. T. (7 April, 2022), "Study of two-dimensional Janus WXY (XY= S, Se, Te) trilayer homostructures for photovoltaic applications using DFT screening of different stacking patterns," **ACS Omega**, American Chemical Society (ACS), vol2022, no.7,15, pp.12947-12
41. (2021), "Reducing Fault Current by Using FACTS Devices to Improve Electrical Power Flow," **Mathematical Problems in Engineering**, Hindawi, vol2021, no.8116816, pp.9
40. (2021), "Real-Time Non-intrusive Electrical Load Classification Over IoT Using Machine Learning," **IEEE Access**, IEEE, vol9, pp.115053-067
39. Islam, M. S., Hasan, M. S., Islam, R. I., Iskanderani, A., Mehedi, I. M. and Hasan, M. T. (2021), "Impact of Channel Thickness on the Performance of GaAs and GaSb DG-JLMOFETs: An Atomistic Tight Binding based Evaluation," **IEEE Access**, IEEE, vol9, pp.117649-659
38. Khan, M. S. H., Islam, M. S., Islam, R. I., Iskanderani, A., Mehedi, I. M. and Hasan, M. T. (2021), "Potential Visible-light Driven PtO<sub>2</sub>/GaN vdW Hetero-bilayer Photocatalysts for Water Splitting using First-principles," **IEEE Access**, IEEE, vol9, pp.109510-521
37. Moznuzzaman, M., Khan, I. and Islam, R. I. (2021), "Nano-layered surface plasmon resonance-based highly sensitive biosensor for virus detection: A theoretical approach to detect SARS-CoV-2," **AIP Advances**, AIP, vol11, pp.065023
36. Moznuzzaman, M., Islam, R. I. and Khan, I. (2021), "Effect of layer thickness variation on sensitivity: An SPR based sensor for formalin detection," **Sensing and Bio-Sensing Research**, Elsevier, vol32(100419), pp.1-10
35. Mime, F. I., Islam, M. R. I., Hossain, E. and Hasan, I. M. M. a. M. T. (2021), "Design and Performance Analysis of Tandem Organic Solar Cells: Effect of Cell Parameter," **IEEE Access**, IEEE, vol9, pp.40665-80
34. Mazumder, A. A. M., Hasan, M. S., Iskanderani, A. I. M., Islam, R. I. and Mehedi, M. T. H. a. I. M. (December, 2020), "Analytical study of Metal-Insulator-Semiconductor contacts for both p- and n-InGaN," **Results in Physics**, Elsevier, vol19, pp.103679
33. Anghi, A. I., Islam, R. I., Hasan, M. T. and Hossain, E. (2020), "Projected Performance of InGaAs/GaAs Quantum Dot Solar Cells: Effects of Cap and Passivation Layers," **IEEE Access**, IEEE, vol8, pp.212339-50
33. Khan, M. S. H., Islam, R. I., Islam, M. S., Mehedi, I. M. and Hasan, M. T. (2020), "Tunable Photocatalytic Properties of Planar GaN/GeC Hetero-bilayer: Production of H<sub>2</sub> Fuels," **IEEE Access**, IEEE, vol8, pp.209030-42
31. Khan, M. S. H., Islam, R. I. and Hasan, M. T. (2020), "Strain-dependent electronic and optical properties of boron-phosphide and germanium-carbide hetero-bilayer: A first-principles study," **AIP Advances**, AIP, vol10, pp.085128
30. Iskanderani, A. I., Mehedi, I. M., Ramli, M. A. and Islam, R. I. (2020), "Analyzing the off-grid performance of hybrid photovoltaic/diesel energy system for a peripheral village," **International Journal of Photoenergy**, Hindawi, vol2020, no.Article ID 7673937, pp.15
29. Hasan, M. S., Mehedi, I. M., Reza, S. F., Kaysir, M. R. and Islam, M. R. I. (2020), "Analytical Investigation of Activation Energy for Mg-doped p-AlGa<sub>N</sub>," **Optical and Quantum Electronics**, Springer, vol52, no.7, pp.384 (1-10)
28. Shuvo, A. A., Islam, M. R. I. and Hasan, M. T. (2020), "Ultrawide-bandgap AlGa<sub>N</sub>-based HEMTs for high-power switching," **Journal of Computational Electronics**, Springer, vol19, no.3, pp.1100-1106
27. Moznuzzaman, M., Islam, R. I., Hossain, M. B. and Mehedi, I. M. (2020), "Modeling of Highly Improved SPR Sensor for Formalin Detection," **Results in Physics**, Elsevier, vol16, no.4, pp.102874
26. (2018), "GaN-based double-gate (DG) sub-10-nm MOSFETs: effects of gate work function," **Journal of Computational Electronics**, Springer, vol17, no.2, pp.663-679
25. Mehedi, I. M., Hasan, M. S., Islam, R. I., Dobaie, A. M. and (2018), "Temperature dependent inhomogeneous optical behavior of AlInGa<sub>N</sub> quaternary alloy," **Journal of Optical Technology**, OSA, vol85(1), no.12
25. (2018), "Temperature induced anomalous exciton localization in InGa<sub>N</sub>/Ga<sub>N</sub> and Ga<sub>N</sub>/AlIn<sub>N</sub> quantum wells," **Journal of Computational Electronics**, Springer, vol17, no.1, pp.373-381
23. Islam, M. J., Islam, R. I. and Hossain, M. M. (2017), "Theoretical Thermal Characterization of 1.55 μm InGa<sub>N</sub> Quantum Well Lasers," **International Journal of Microwave and Optical Technology**, vol12, no.6
22. (2017), "Equivalent Circuit - Level Characterization of 1.55 μm InGa<sub>N</sub> Laser," **Global Journal of Researches in Engineering : F Electrical and Electronics Engineering**, Global Journals Inc. (USA), vol17, no.4, pp.42-48
21. Hossain, M. A., Islam, R. I., Hossain, M. K. and Yamamoto, A. H. a. A., "Dislocation Reduction in Heteroepitaxial In<sub>x</sub>Ga<sub>1-x</sub>N Using Step-graded Interlayer for Future Solar Cells," **Materials for Renewable and Sustainable Energy**, Springer, pp.2013
20. Islam, R. I., Kaysir, M. R., Islam, M. J. and Yamamoto, A. H. a. A. (2013), "MOVPE Growth of In<sub>x</sub>Ga<sub>1-x</sub>N (x ~ 0.4) and Fabrication of Homo-junction Solar Cells," **Journal of Materials Science & Technology**, Elsevier publication, vol29, no.2, pp.128-136
20. Hasan, M. S., Saha, A. K., Islam, R. I. and Amin, N. (2013), "Mathematical Modeling of Growth Conditions and Interpretation of Phase Diagram for In<sub>x</sub>Ga<sub>1-x</sub>N Epitaxial Layer," **Applied Mechanics and Materials**, vol372, pp.70-74

### Conference

65. (Feb 23-25, 2023), "Effect of Recessed Gate Metal on Performance Analysis of GaAs Based DG-JLMOFET," **3rd International Conference on Electrical Computer and Communication Engineering 2023 (ECCE02023)**
64. Pratyay, A. A., Nahar, T., Hasan, M. S., Sultana, S. and Islam, R. I. (27-28 January, 2023), "Impact of Channel Length Scaling on the Performance of Recessed GaAs Channel DGJLFET," **International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics (ICIITCEE 2023)**, IEEE
63. Mashrur, W., Salim, S. B., Sultana, S., Hasan, M. S., Zaman, M. U. and Islam, K. M. Z. R. a. M. R. I. (2022), "Effect of Extended Back Gate in

- GaAs Based DG-JLMOFET," **2022 25th International Conference on Computer and Information Technology (ICCIT)** , IEEE
62. (2022) , "Effect of Sidewall Spacers on the Performance of GaAs Based DG-JLMOFET," **2022 IEEE Region 10 Symposium (TENSYP)** , IEEE
61. (2022) , "Performance Analysis of GaAs DG-JLMOFET: Impact of Gate Oxide and Its Thickness," **2022 IEEE Region 10 Symposium (TENSYP)** , IEEE
60. Shuvro,A. D. , Roy,A. , Hasan,M. S. and Islam,a. <. R. I. (24-26 February, 2022) , "Performance Analysis of SiSn Based High Efficiency p-n Junction Solar Cell," **2nd International Conference on Advancement in Electrical and Electronic Engineering** , IEEE
59. Khan,M. S. H. and Hasan,<. R. I. a. M. T. (17-19 December 2021) , "Zn,O Co-doped 2D GaN for Visible Light-driven Photocatalytic Water Splitting using First-principles," **EICT** , IEEE
58. Hasan,M. S. and Islam,S. S. a. <. R. I. (18-20 November, 2021) , "Performance Analysis of Graphene/AlxGa1-xN Schottky Contact at Elevated Temperature," **ICEEICT** , IEEE
57. Joy,J. A. H. , Islam,<. R. I. , Hasan,N. , Mehedi,I. M. and Bassi,M. J. R. a. H. (March 22-25, 2021) , "Electrical Power Flow Improvement by Reducing Fault Current using FACTS Devices," **18th IEEE International Multi-Conference on Systems, Signals & Devices 2021** , IEEE
56. Khan,M. S. H. and Hasan,<. R. I. a. M. T. (17-19 December, 2020) , "Electronic and Optical Properties of BeO Co-doped 2D GaN using First-principles," **11th International Conference on Electrical and Computer Engineering (ICECE)** , IEEE
55. Islam,J. , Khan,S. H. , Islam,<. R. I. and Islam,M. S. (19-20 December, 2020) , "Temperature Induced Anomalous Exciton Localization Dynamics of CH<sub>3</sub>NH<sub>3</sub>Pb(I<sub>1-x</sub>Br<sub>x</sub>)<sub>3</sub> Perovskite Material: A Monte Carlo Simulation," **2nd International Conference on Sustainable Technologies for Industry 4.0 (STI)** , IEEE
54. Khan,M. S. H. ,Mime,F. I. and Islam,<. R. I. (05-07 JUNE 2020) , "Electronic and Optical Properties of Sn Doped Hexagonal BN Monolayer: A First-principles Study," **IEEE TENSYP2020**
53. Mime,F. I. , Khan,M. S. H. , Asaduzzaman,S. M. , Karim,N. and Islam,<. R. I. (05-07 JUNE 2020) , "Efficient Triple Junction Organic Solar Cell," **IEEE TENSYP 2020**
52. (19-21 February 2020) , "Automatic Control Approach of Reactive Power Compensation of Smart Grid," **The 2nd International Conference on Artificial Intelligence in Information and Communication (ICAIC)** , pp.716-719
51. Haque,M. J. , Kaysir,M. R. , Islam,M. J. and Islam,a. <. R. I. (11-12 July 2019) , "State Modeling to Investigate the CW Pumping Behaviour of Organic Solid-State Lasers," **International Conference on Computer, Communication, Chemical, Material and Electronic Engineering (IC4ME2)**
50. Islam,A. A. , Hasan,M. S. , <. R. I. <. , Kaysir,M. R. and Mehedi,a. I. M. (7-9 February, 2019) , "Study of Ohmic Contact on p-InGaN Using MIGS Model," **2nd International Conference on Electrical, Computer and Communication Engineering (ECCE)**,
49. Mondal,P. P. , Khan,M. S. H. , Kaysir,M. R. and ,a. <. M. R. I. <. (7-9 February, 2019) , "Performance Analysis of Perovskite Solar Cells with Different Structures," **2nd International Conference on Electrical, Computer and Communication Engineering (ECCE)**,
48. Alam,M. M. , Islam,<. M. R. I. , Mehedi,I. M. and Moreira,a. C. (7-9 February, 2019) , "Continuous Power Flow Analysis for Micro- Generation Integration at Low Voltage Grid," **2nd International Conference on Electrical, Computer and Communication Engineering (ECCE)**,
47. Rifat,M. R. H. , Kaysir,M. R. , Khan,M. S. H. and Islam,a. <. M. R. I. (7-9 February, 2019) , "Effect of the electron blocking layer in dualwavelength emission of InGaN/GaN MQW lightemitting diodes," **2nd International Conference on Electrical, Computer and Communication Engineering (ECCE)**,
46. Mahamud,F. , Hasan,M. S. , Islam,<. R. I. , , Islam,M. S. and Hasan,a. M. T. (21-23, 2018) , "Temperature Induced Localization Dynamics of Exciton in ZnO/MgZnO and CdZnO/MgZnO Quantum Well," **10th International Conference on Electrical and Computer Engineering (ICECE-2018)**
45. Sarker,M. A. R. and Islam,<. R. I. (7-9 December 2017, Khulna, Banglade) , "Performance Improvement of Superconducting Magnetic Energy Storage Based ACO Controlled Hybrid Micro-Grid System," **3rd International Conference on Electrical Information and Communication Technology (EICT)**
44. Bose,S. , Islam,<. R. I. , Islam,T. and Rafiq,a. M. A. (7-9 December 2017, Khulna, Banglade) , "Fuzzy Logic Based Sensorless Adaptive Direct Torque Control of Surface Permanent Magnet Synchronous Motor (SPMSM) Drives," **3rd International Conference on Electrical Information and Communication Technology (EICT)**
43. Islam,T. ,Islam,<. R. I. and Bose,S. (September 28-30, 2017) , "Design and Performance Analysis of Neural Network Based Dynamic Stability Controller for Multi-Generator Power System," **4th International Conference on Advances in Electrical Engineering (ICAEE)**
43. Howlader,A. H. , Islam,M. S. , Islam,<. R. I. and Bhuiyan,A. G. (June 18-21, 2017) , "Vacancy Induced Phonon Properties of Single Wall Carbon Nanotube," **The 6th International Symposium on Organic and Inorganic Electronic Materials and Related Nanotechnologies (EM-NANO 2017)**
42. Karim,N. , Mime,F. I. , Islam,<. R. I. and Mehedi,I. M. (February 16-18, 2017.) , "Performance Analysis of P3HT:PCBM Based Organic Solar Cell," **International Conference on Electrical, Computer and Communication Engineering (ECCE)**
41. Karim,N. , Mime,F. I. , Islam,<. R. I. and Mehedi,I. M. ( February 16-18, 2017) , "Tandem Organic Solar Cells with Improved Efficiency," **International Conference on Electrical, Computer and Communication Engineering (ECCE)**
40. Islam,M. R. ,Hasan,M. S. and Islam,a. <. R. I. (20-22, 2016) , "Estimation of Exciton Confinement in III-Nitride Quantum Wires," **9th International Conference on Electrical and Computer Engineering (ICECE-2016)**
39. Ziad,H. A. and Islam,<. R. I. (20-22, 2016) , "Active Management of Wind Turbine-Diesel Generator Hybrid System Considering Economic Criteria," **9th International Conference on Electrical and Computer Engineering (ICECE-2016)**
39. Nesa,S. A. , Ali,M. O. , Bhuiyan,A. G. , Islam,<. R. I. and Islam,M. S. (May 13-14, 2016) , "Effect of phosphor distribution on junction temperature reduction in white LEDs," **IEEE 5th International Conference on Informatics, Electronics and Vision (ICIEV)** , pp. pp.985-98
38. Rahamatullah,S. , Hasan,M. S. , Islam,<. R. I. , Alom,M. Z. and Mehedi,I. M. (13-14, May 2016) , "Theoretical Investigation of Gibbâ€™s Free Energy and Phase Diagram for InxGa1-xN Nano-Film System," **5th International Conference on Informatics, Electronics & Vision (ICIEV-2016)**, IEEE,
37. Hasan,M. S. , Islam,<. R. I. , Islam,M. S. , Mehedi,I. M. and ,a. (November 8-13, 2015) , "Temperature dependent nonmonotonous optical behavior of InGaN epitaxy," **6th International Symposium on Growth of III-Nitrides, ISGN-6**,
36. Sabid,I. , Hasan,M. S. , Islam,M. F. a. <. R. and Mehedi,<. I. M. (10-12 December 2015) , "Effect of Dislocation Density on the Performance of InGaN-Based MJ Solar Cell:Analytical Approach," **2nd International Conference on Electrical Information and Communication Technology (EICT)**
35. Hasan,S. , Alom,Z. , Mehedi,I. M. , Ullah,S. R. and ,<. I. <. (4-6 November, 2015) , "Estimation of Minority Carrier Lifetime in InGaN Single Junction Solar Cell ," **International Conference on Electrical & Electronic Engineering (ICEEE 2015)**
34. Akter,T. , Rafique,M. Z. E. , Hasan,M. S. , Islam,<. R. I. , Mehedi,I. M. and Alshareef,A. (February 16-19, 2015) , "InxGa1-xN-BASED MULTI-JUNCTION SOLAR CELL: MODELING AND PERFORMANCE ANALYSIS USING MATLAB/SIMULINK," **3rd International Conference on Energy Systems and Technologies**
33. Paul,S. and Islam,M. S. H. a. <. R. I. (December 20-22, 2014) , "Barrier Height Control of Metal/n-In<sub>0.2</sub>Ga<sub>0.8</sub>N with an Ultrathin Interfacial Layer," **8th International Conference on Electrical and Computer Engineering (ICECE-2014)**
32. Hasan,M. N. and Islam,M. S. H. a. <. R. I. (December 20-22, 2014) , "Low Activation Energy of Mg-doped InxGa1-xN (x~0.4) and Self-

compensation Modelling," **8th International Conference on Electrical and Computer Engineering (ICECE-2014)**

31. Hossain, M. A. , Kabir, M. F. , Kabir, R. and Islam, <. R. I. (5-6 September 2014) , "Optimal On-Grid Hybrid Renewable Energy Model for Coastal Area : Bangladesh Perspective," **2nd International Conference on Green Energy and Technology, ICGET 2014**

30. Chakma, S. and Islam, M. S. I. a. <. R. I. , "Performance Optimization of Planar Heterojunction Organic Solar Cells," **3rd International Conference on the Developments in Renewable Energy Technology, ICDRET 2014**

29. Hossain, M. J. , Hasan, M. and Islam, M. H. a. <. R. I. (Jan. 9-11, 2014 Dhaka, Bangladesh,) , "Design and Implementation of a Grid Connected Single Phase Inverter for Photovoltaic System," **3rd International Conference on the Developments in Renewable Energy Technology, ICDRET 2014**

28. Howlader, M. A. H. , Saha, A. K. , Hasan, M. S. and Islam, <. R. I. , "Analysis of Phase Separation in InGaN Epitaxy for Advanced Solar Cells," **3rd International Conference on the Developments in Renewable Energy Technology, ICDRET 2014,**

27. Khatun, S. , Sanobar, S. A. and Islam, M. A. H. a. <. M. R. I. , "Effects of Interlayers in Threading Dislocation Reduction of Step-graded InGaN Heteroepitaxy," **International Conference on Electrical Information and Communication Technology**

26. Khan, M. E. and , A. B. a. <. M. R. I. <. , "Restricted Earth Fault Protection with Superconducting Fault Current Limiter for 100% Stator Winding," **International Conference on Electrical Information and Communication Technology**

21. Dev, D. , Islam, A. , Islam, <. R. I. and Yamamoto, M. A. H. a. A. , "A Theoretical Approach for the Dislocation Reduction of Wurtzite In<sub>x</sub>Ga<sub>1-x</sub>N/GaN Heteroepitaxy," **7th International Conference on Electrical and Computer Engineering (ICECE-2012)** , IEEE

20. Ahmed, S. , Iqbal, S. N. , Sakib, N. and Islam, a. <. R. I. , "Design and Implementation of Data String Transceiver Using GNU radio," **7th International Conference on Electrical and Computer Engineering (ICECE-2012)** , IEEE

19. Islam, A. , Dev, D. , Hossain, M. A. and Yamamoto, <. R. I. a. A. , "Misfit Dislocation Reduction of In<sub>x</sub>Ga<sub>1-x</sub>N/GaN Heteroepitaxy Using Graded Layer," **International Conference on Advanced Material Engineering & Technology (ICAMET 2012)**

18. Hossain, <. R. I. <. M. A. and Yamamoto, A. H. a. A. , "Strain Relaxation and Improvement of Epi-Layer Quality Using Step-graded Layers for MOVPE In<sub>x</sub>Ga<sub>1-x</sub>N (x ~ 0.4)," **International Conference on Informatics, Electronics & Vision (ICIEV-2012)** , IEEE

17. Hossain, M. A. , Islam, <. R. I. , Hasan, M. M. , Yamamoto, A. , Hashimoto, a. A. and ,, "A Mathematical Modeling of Dislocations Reduction in In<sub>x</sub>Ga<sub>1-x</sub>N/GaN Heteroepitaxy Using Step-graded Interlayers," **The 7th International Conference on Electrical and Computer Engineering (ICECE-2012)** , IEEE