# Fakhra Aziz

**Department of Electronics,**

**University of Peshawar, Peshawar, Pakistan**

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# EDUCATION:

* University of Malaya, Kuala Lumpur, Malaysia

***Postdoc (2016)***

* Ghulam Ishaq Khan Institute of Engineering Sciences & Technology, Topi, Pakistan

***Doctor of Philosophy in Engineering Sciences (Applied Physics), 2012***

* Quaid-e-Azam University, Islamabad, Pakistan

***Master of Philosophy in Electronics, 1998***

* University of Peshawar, Peshawar, Pakistan

***M.Sc. in Electronics, 1992***

* University of Peshawar, Peshawar, Pakistan

***B.Sc., 1990***

* BISE, Peshawar, Pakistan

***F.Sc., 1988***

* BISE, Peshawar, Pakistan

***S.S.C., 1986***

# DISTINCTION:

* Gold Medal in M.Sc. (Electronics), University of Peshawar (1992)
* Silver Medal in F.Sc. (General Science), Board of Intermediate and Secondary Education, Peshawar (1988)

# RESEARCH:

* M. Phil research on “Digital Image Compression using Thresholding and Edge Detection” under the supervision of Dr. Abbas A. Naqvi, Department of Electronics, Quaid-e-Azam University, Islamabad, Pakistan
* Ph.D. research on “Investigation of Electrical and Optoelectronic Properties of Vanadyl Phthalocyanine for Organic Electronic Devices” under supervision of Prof. Dr. Muhammad Hassan Sayyad, Faculty of Engineering Sciences, GIK Institute of Engineering Sciences and Technology, Topi, Swabi, KP, Pakistan

# RESEARCH INTERESTS

* Perovskite Solar Cells
* Organic Solar Cells
* Organic Sensors

1. Thin Film Deposition and Characterization
2. Investigation of organic materials for the fabrication of electronic and optoelectronic devices
3. Nanostructures

# EXPERIMENTAL SKILLS:

Thin Film Deposition: Vacuum Thermal Evaporation and Spin Coating.

Material Characterization: AFM, UV/Visible/IR and FT-IR Spectroscopy, Raman Spectroscopy, Surface Profiler, X-ray Diffraction

Device Characterization: Electrical, Optical, Structural and Temperature Dependent Analyses

# WORK EXPERIENCE:

* Professor (May 10, 2022 to date), Department of Electronics, University of Peshawar, Pakistan
* Associate Professor (August 02, 2021 to May 09, 2022), Department of Electronics, University of Peshawar, Pakistan
* Associate Professor (October 04, 2015 to August 01, 2021), Jinnah College for Women, University of Peshawar, Pakistan
* Assistant Professor (August 23, 2007 to October 03, 2015), Jinnah College for Women, University of Peshawar, Pakistan
* Lecturer (January 27, 1996 to August 22, 2007), Jinnah College for Women, University of Peshawar, Pakistan
* Visiting faculty at Department of Geography and Geomatics, University of Peshawar (2023)

(***Computers and Information Technology***)

* Visiting faculty at Department of Electronics, University of Peshawar (Spring 2013)

(***Solid State Electronic Materials*** to M.Phil students)

* Visiting faculty at Department of Gender Studies, University of Peshawar (2006-7, 2021-22)

(***Computers and Information Technology***)

* Visiting faculty at Department of Computer science, University of Peshawar (2003-5)

(***Analog and Digital Electronics***)

* Research Fellow, Low Dimensional Materials Research Center, Department of Physics, University of Malaya, Malaysia (April, 2010 to December, 2010)

# RESEARCH FUNDING PROJECT:

* Principal Investigator of “*A synergistic approach of surface engineering of electron transport layer by amino acid for enhanced efficiency and stability of perovskite solar cells*” for a period of three years funded by the Higher Education Commission (HEC) of Pakistan, under the National Research Program for Universities (NRPU) research grant worth Rs. 18.75 millions.

# RESEARCH COLLABORATION:

* Low Dimensional Materials Research Center, Department of Physics, University of Malaya, Malaysia since 2010
* GIK Institute of Engineering Sciences and Technology, Topi, Swabi, KP, Pakistan

since 2012

* Department of Physics, Abdul Wali Khan University Mardan, Pakistan since 2012
* Center for Advanced Materials (CAM), Qatar University, Doha, Qatar since 2014
* Electrical Engineering, South Dakota State University, South Dakota, USA since 2017
* Department of Chemistry, Bacha Khan University Charsadda, Pakistan since 2019
* Department of Physics, Islamic International University, Islamabad since 2023
* Faculty of Engineering, Technology & Built Environment, UCSI, Malaysia since 2023

# AWARDS & ACHIEVEMENTS

* Indigenous Scholarship for PhD Studies by Higher Education Commission Pakistan (2008-12)
* Research fellow at Low Dimensional Materials Research Center, Department of Physics, University of Malaya, Malaysia for almost a year under International Research Support Initiative Program by Higher Education Commission Pakistan and Student Exchange Program of University of Malaya (2010)
* Postdoc Fellowship Program by Higher Education Commission, Pakistan (2015-16)

# GUEST EDITOR INTERNATIONAL JOURNAL

* Guest Editor in the Special Issue “Applications of Scanning Electron Microscopy in Electronic Materials’ Thin films and Devices" in Scanning.

# CONFERENCES ARRANGED

* Organizing member of Symposium, University of Malaya, Malaysia 2016
* Organizing member of Symposium, GIK Institute, Pakistan 2013

# TRAININGS

* Attended a training on Perovskite Solar Cells from November 7 - 17, 2017 in the Department of Electrical Engineering and Computer Science at the South Dakota State University, USA.
* Attended a training on Electrochemical Impedance Spectroscopy (EIS) from August 20 - 25, 2023 at the Center for Advanced Studies, Qatar University, Qatar.

# JOURNAL PUBLICATIONS:

1. Ehsan Raza, Jolly Bhadra, Muhammad Asif, **F. Aziz**, Noora J. Al-Thani, Zubair Ahmad, A numerical approach to study the effect of bandgap and electron affinity in HTL-free perovskite solar cells and design of two-terminal silicon/ perovskite tandem solar cell, Materials Today Communications **37** (2023) 107383 (IF = 3.662).
2. Ehsan Raza, Zubair Ahmad, Muhammad Asif, **F. Aziz,** Muhammad Qasim Mehmood, Jolly Bhadra, Noora J. Al-Thani, Design and optimization of four-terminal mechanically stacked and optically coupled silicon/perovskite tandem solar cells with over 28% efficiency, Heliyon **9** (2023) 13477 (IF = 3.776).
3. Muhammad Tahir, Ikram Ud Din, Muhammad Zeb, **F. Aziz**, Fazal Wahab, Zahid Gul, Alamgeer, Mahidur R. Sarker, Sajad Ali, Sawal Hamid Md Ali and Ioannis Kymissis, Thin Films Characterization and Study of N749-Black Dye for Photovoltaic Applications, Coatings **12** (2022) 1163 (IF= 2.864).
4. Ehsan Raza, Zubair Ahmad, Muhammad Asif, **F. Aziz**, Kashif Riaz, Muhammad Qasim Mehmood, Jolly Bhadra, Noora J. Al-Thani, Numerical modeling and performance optimization of carbon-based hole transport layer free perovskite solar, Optical Materials **125** (2022) 112075 (IF= 3.754).
5. Raza, E., Z. Ahmad, **F. Aziz**, M. Asif, A. Ahmed, K. Riaz, J. Bhadra, N. J. Al-Thani, Numerical simulation analysis towards the effect of charge transport layers electrical properties on cesium based ternary cation perovskite solar cells performance, Solar Energy **225** (2021) 842-850 (IF= 5.742).
6. Raza, E., **F Aziz**, A Mishra, NJ Al-Thani, Z Ahmad, MAPbI3 microrods based photo resistor switches: fabrication and electrical characterization, Materials **14** (2021) 4385 (IF= 3.623).
7. Ahmad, Z., A. Mishra, S. M. Abdulrahim, D. Taguchi, P. Sanghyun, **F. Aziz**, M. Iwamoto, T. Manaka, J. Bhadra and N. J. Al-Thani, Consequence of aging at Au/HTM/perovskite interface in triple cation 3D and 2D/3D hybrid perovskite solar cells, Scientific Reports **11** (2021) 1-11 (IF= 4.1).
8. Rehman, K., **F. Aziz**, Z. Ahmad, K. Alamgir, M. Asif, M. Tahir, K. Sulaiman, S. Bashir, E. Raza and F. F. Muhammad Sharif, Improvement of capacitive humidity sensors using tris (8-hydroxyquinoline) gallium (Gaq 3) nanofibers as a dielectric layer, Journal of Materials Science: Materials in Electronics **31**  (2020) 21702-21710 (IF= 2.478).
9. Tahir, M., M. Ilyas, **F. Aziz**, M. R Sarker, M. Zeb, M. A. Ibrahim and R. Mohamed, Fabrication and Microelectronic Properties of Hybrid Organic–Inorganic (poly (9, 9, dioctylfluorene)/p-Si) Heterojunction for Electronic Applications, Applied Sciences **10** (2020) 7974 (IF= 2.48).
10. Uddin, S. I., M. Tahir, **F. Aziz**, M. R. Sarker, F. Muhammad, D. Nawaz Khan and S. Hamid Md Ali (2020), Thickness Optimization and Photovoltaic Properties of Bulk Heterojunction Solar Cells Based on PFB–PCBM Layer, Energies **13** (2020) 5915 (IF= 3.06).
11. Raza, E., Z. Ahmad, A. Mishra and **F. Aziz**, Metal halide-based photodetector using one-dimensional MAPbI 3 micro rods, Journal of Materials Science: Materials in Electronics **31** (2020) 12109-12115 (IF= 2.478).
12. Islam, Z. U., M. Tahir, W. A. Syed, **F. Aziz**, F. Wahab, S. M. Said, M. R Sarker, S. H. Md Ali and M. F. M. Sabri, Fabrication and photovoltaic properties of organic solar cell based on zinc phthalocyanine, Energies **13** (2020) 962 (IF= 3.06).
13. Z. Ahmad, **F. Aziz,** H. Y. Abdullah, Study on the stability of the mixed (MAPbI3 and MAPbBr3) perovskite solar cells using dopant-free HTL, Organic Electronics, **76** (2020) 105453 (IF= 3.31).
14. **F. Aziz**, A. Anuar, Z. Ahmad, N. A. Roslan, A. H. A. Makinudin, T. M. Bawazeer, N. Alsenany, M. S Alsoufi, A. Supangat, [Enhancing the Electrical Properties of Vertical OFETs Using a P (VDF-TrFE) Dielectric Layer](https://link.springer.com/article/10.1007/s11664-019-07805-3), Journal of Electronic Materials, **49** (2019) 1-10 (IF= 1.77).
15. R. Andika, **F. Aziz**, Z. Ahmad, M. Doris, V. Fauzia, T. M. Bawazeer, N. Alsenany, M. S. Alsoufi and A. Supangat, Organic nanostructure sensing layer developed by AAO template for the application in humidity sensors, Journal of Materials Science: Materials in Electronics, **30** 2382-8 (2019) (IF= 2.478).
16. L.W. Lim, **F. Aziz**, Z. Ahmad, N.A. Roslan, A. Supangat, K. Sulaiman, Planar capacitive type humidity sensor fabricated using PTB7-Th by facile solution processing approach, Applied Physics A: : Materials Science & Processing **125** (2019) 16 (IF= 1.81).
17. E. Raza, **F. Aziz**, Z. Ahmad, Stability of organometal halide perovskite solar cells and role of HTMs: recent developments and future directions, RSC Advances **8** (2018) 20952-67 (IF= 3.12).
18. **F. Aziz**, Z. Ahmad, M A. Najeeb, H. A. Malik, S. M. Abdullah, F. Touati, K. Sulaiman, Colloidal distribution of the PCPDTBT and VOPcPhO in the organic amalgam thin films and their optical properties, Applied Physics A: Materials Science & Processing **123** (2017) 773 (IF= 1.81).
19. **F. Aziz**, A.A. Bakar, Z. Ahmad, T.M. Bawazeer, N. Alsenany, M.S. Alsoufi, A. Supangat, Template-assisted growth of nanoporous VTTBNc films: Morphology and moisture sensitivity studies, Materials Letters **211** (2017) 195-8 (IF= 3.20).
20. F.F. Muhammad, M.Y. Yahya, S.S. Hameed, **F. Aziz**, K. Sulaiman, M.A. Rasheed, Z. Ahmad, Employment of single-diode model to elucidate the variations in photovoltaic parameters under different electrical and thermal conditions, PLOS ONE **12** (2017) e0182925 (IF= 2.74).
21. M.I. Azmer, **F. Aziz**, Z. Ahmad, E. Raza, M.A. Najeeb, N. Fatima, T.M. Bawazeer, M.S. Alsoufi, R. Shakoor, K. Sulaiman, “Compositional engineering of VOPcPhO-TiO 2 nano-composite to reduce the absolute threshold value of humidity sensors”, *Talanta*, **174** (2017) 279-84 (IF= 5.34).
22. N. Fatima, **F. Aziz**, Z. Ahmad, M. Najeeb, M. Azmeer, K.S. Karimov, M. Ahmed, S. Basheer, R. Shakoor, K. Sulaiman, “Compositional engineering of the pi-conjugated small molecular VOPcPhO: Alq3 complex to boost humidity sensing”, *RSC Advances*, **7** (2017) 19780-6 (IF= 3.12).
23. F.F. Muhammad, M.Y. Yahya, **F. Aziz**, M.A. Rasheed, K. Sulaiman, “Tuning the extinction coefficient, refractive index, dielectric constant and optical conductivity of Gaq3 films for the application of OLED displays technology”, *Journal of Materials Science: Materials in Electronics*, **28** (2017) 14777– 86 (IF= 2.478).
24. **F. Aziz**, N.A. Bakar, S. Bashir, H. Alhummiany, T. Bawazeer, N. Alsenany, A. Mahmoud, A. Supangat, K. Sulaiman, “Effective transformation of PCDTBT nanorods into nanotubes by polymer melts wetting approach”, *Journal of Saudi Chemical Society*, 21 (2017) 720-30 (IF= 3.52).
25. M. Doris, **F. Aziz**, H. Alhummiany, T. Bawazeer, N. Alsenany, A. Mahmoud, R. Zakaria, K. Sulaiman, A. Supangat, “Determining the Effect of Centrifugal Force on the Desired Growth and Properties of PCPDTBT as p-Type Nanowires”, *Nanoscale Research Letters*, **12** (2017) 67(1-11) (IF= 3.58).
26. L. W. Lim, **F. Aziz**, F. F. Muhammad, A. Supangata, K. Sulaiman, “Electrical properties of Al/PTB7-Th/n-Si metal-polymer-semiconductor Schottky barrier diode” *Synthetic Metals*, **221** (2016) 169-175 (IF= 3.29).
27. M. A. Najeeb, S. M. Abdullah, **F. Aziz**, Z. Ahmad, R.A. Shakoor, A. M. A. Mohamed, U. Khalil, S. Wageh, A. A. Al-Ghamdi, K. Sulaiman, “A comparative study on the performance of hybrid solar cells containing ZnSTe QDs in hole transporting layer and photoactive layer”, *Journal of Nanoparticles Research*, **18** (2016) 384(1-8) (IF= 2.13).
28. F. Wahab, M. Sayyad, D.N. Khan, M. Tahir, **F. Aziz**, R. Khan, K.S. Karimov, “Sensing properties of cobalt-phthalocyanine-based multipurpose sensor”, *Journal of Electronic Materials*, **46** (2016) 2045-52 (IF= 1.77).
29. H.A. Malik, **F. Aziz**, M. Asif, E. Raza, M.A. Najeeb, Z. Ahmad, W. Swelm, Q. Zafar, F. Touati, A.H. Kamboh, “Enhancement of optical features and sensitivity of MEH-PPV/VOPcPhO photodetector using CdSe quantum dots”, *Journal of Luminescence*, **180** (2016) 209-13 (IF= 3.28).
30. E. Raza, M. Asif, **F. Aziz,** M. I. Azmer, H. A. Malik, C. H. Teh, M. A. Najeeb, Q. Zafar, Z. Ahmad, F. Wahab, R. D.aik, N. M. Sarih, A. Supangat, K. Sulaiman, “Influence of thermal annealing on a capacitive humidity sensor based on newly synthesized macroporous PBObzT2“, Sensors and Actuators B: Chemical, **233** (2016) 146-53 (IF= 7.10).
31. M. A. Najeeb, S. M. Abdullah, **F. Aziz**, Z. Ahmad, S. Rafique, S. Wageh, A. A. Al-Ghamdi, K. Sulaiman, F. Touati, R.A. Shakoor, N.J. Al-Thani, “Structural, morphological and optical properties of PEDOT:PSS/QDs nano-composite films prepared by spin-casting”, *Physica E: Low-dimensional Systems and Nanostructures*, **83** (2016) 64-8 (IF= 3.57).
32. M. A. Najeeb, S. M. Abdullah, **F. Aziz**, M. I. Azmer, W. Swelm, A A. Al-Ghamdi, Z. Ahmad, A. Supangat and K. Sulaiman, “Improvement in the photovoltaic properties of hybrid solar cells by incorporating a QD-composite in the hole transport layer”, RSC Advances, **6** (2016) 23048-57 (IF= 3.12).
33. Q. Zafar, **F. Aziz** and K. Sulaiman, “Eco-benign visible wavelength photodetector based on phthalocyanine-low bandgap copolymer composite blend”, RSC Advances, **6** (2016) 13101-9 (IF= 3.12).
34. F. Rehman, M. Tahir, S. Hameed, F. Wahab, **F. Aziz**, F. Khalid, M. N. Khalid, and W. Ali, "Investigating sensing properties of poly-(dioctylfluorene) based planar sensor," *Materials Science in Semiconductor Processing,* **39** (2015) 355-61 (IF= 3.09).
35. **F. Aziz**, K. Sulaiman, W. K. Al-Rawi, Z. Ahmad, M. H. Sayyad, K. Karimov, L. L. Wei, M. Tahir, and L. Lin, "Enhancement of electrical properties of vanadyl phthalocyanine derivative by PCBM," Pigment & Resin Technology, **44** (2015) 148-56 (IF= 1.01).
36. K. Karimov, N. Ahmad, M. M. Bashir, **F. Aziz**, M. Z. Yousaf, A. Khan, M. Tahir, N. A. Zaidi, M. Hafeez, and A. S. Bhatti, "Flexible resistive tensile load cells based on MWCNT/rubber composites," *Pigment & Resin Technology,* **44** (2015) 187-91 (IF= 1.01).
37. M. Tahir, M. H. Sayyad, F. Wahab, **F. Aziz**, I. Ullah, and G. Khan, "Enhancement in electrical properties of ITO/PEDOT:PSS/PTCDA/Ag by using calcium buffer layer," *Physica B: Condensed Matter,* **466–467** (2015) 38-43 (IF= 1.90)..
38. **F. Aziz,** Z. Ahmad, S. M. Abdullah, K. Sulaiman and M. H. Sayyad, “Photovoltaic effect in single-junction organic solar cell fabricated using Vanadyl Phthalocyanine soluble derivative”, *Pigment & Resin Technology,* **44** (2015) 26-32 (IF= 1.01).
39. F. Wahab, M. H. Sayyad, M. Tahir, D. N. Khan, **F. Aziz**, M. Shahid, M. A. Munawar, J. A. Chaudry, and G. Khan, "Electrical characterization of cobalt phthalocyanine/n-Si heterojunction," *Synthetic Metals,* **198** (2014) 175-80 (IF= 3.29).
40. M. Tahir, M. H. Sayyad, J. Clark, F. Wahab, **F. Aziz**, M. Shahid, M. A. Munawar, and J. A. Chaudry, "Humidity, light and temperature dependent characteristics of Au/N-BuHHPDI/Au surface type multifunctional sensor," *Sensors and Actuators B: Chemical*, **192** (2014) 565-71 (IF= 7.10).
41. F. Wahab, M. H. Sayyad, D. Nawaz Khan, M. Tahir, **F. Aziz**, M. Shahid, M. Ali Munawar, and J. Anwar Chaudry, "Electrical characterization of cobalt phthalocyanine/p-silicon heterojunction," *Materials Science in Semiconductor Processing,* **26** (2014) 101-6 (IF= 3.09).
42. M. Tahir, M. H. Sayyad, F. Wahab, F. A. Khalid, **F. Aziz**, S. Naeem, and M. N. Khalid, "Enhancement in the sensing properties of methyl orange thin film by TiO2 nanoparticles," *International Journal of Modern Physics B,* **28** (2014) 1450032 (IF= 0.83).
43. M. Tahir, M. H. Sayyad, F. Wahab, **F. Aziz**, M. Shahid, and M. A. Munawar, "Perylene diimide: Synthesis, fabrication and temperature dependent electrical characterization of heterojunction with p-silicon," Physica B: Condensed Matter, **426** (2013) 6-12 (IF= 1.90).
44. M. Tahir, M. H. Sayyad, F. Wahab, D. N. Khan, and **F. Aziz**, "The electrical characterization of Ag/PTCDA/PEDOT:PSS/p-Si Schottky diode by current–voltage characteristics," *Physica B: Condensed Matter,* **415** (2013) 77-81 (IF= 1.90).
45. Z. Ahmad, M. H. Sayyad, F. Wahab, K. Sulaiman, M. Shahid, J. A. Chaudry, M. A. Munawar, and **F. Aziz**, "Enhancement of electronic and charge transport properties of NiPc by potassium-tetrasulpho group," *Physica B: Condensed Matter,* **413** (2013) 21-23 (IF= 1.90).
46. S. M. Abdullah, Z. Ahmad, **F. Aziz**, K. Sulaiman, “Investigation of VOPcPhO as an acceptor material for bulk heterojunction solar cells,” Organic Electronics, **13** (2012) 2532-7 (IF= 3.31).
47. **F. Aziz**, M. H. Sayyad, Zubair Ahmad, K. Sulaiman, M.R. Muhammad, Kh.S. Karimov “Spectroscopic and microscopic studies of thermally treated Vanadyl 2,9,16,23-tetraphenoxy-29H,31H-phthalocyanine thin ﬁlms”, *Physica E: Low-dimensional Systems and Nanostructures,* **44** (2012) 1815-9 (IF= 3.57).
48. **F. Aziz*,*** K. Sulaiman, K. Karimov, M. Muhammad, M. H. Sayyad, and B. Majlis, "Investigation of optical and humidity-sensing properties of vanadyl phthalocyanine thin films," *Molecular Crystals and Liquid Crystals*,**566** (2012) 22-33 (IF= 0.51).
49. **F. Aziz**, M. H. Sayyad, K. Sulaiman, B. Majlis, K. S. Karimov, Z. Ahmad, and G. Sugandi, "Influence of humidity conditions on the capacitive and resistive response of an Al/VOPc/Pt co-planar humidity sensor," *Measurement Science and Technology,* **23** (2012) 014001 (IF= 1.86).
50. **F. Aziz**, M. Sayyad, K. S. Karimov, M. Saleem, Z. Ahmad, and S. M. Khan, "Characterization of vanadyl phthalocyanine based surface-type capacitive humidity sensors," *Journal of Semiconductors,* **31** (2010) 114002.

# CONFERENCE GUEST SPEAKER

1. **F. Aziz, “**Organic Humidity Sensors”, 2nd International Meet & Expo on Semiconductors, Optoelectronics and Nanostructures (SEMICONMEET2022), Barcelona, Spain, September 12-14, 2022 (Invited Talk).
2. **F. Aziz**, M. A. Najeeb, Z. Ahmad, R. A. Shakoor3 and K. Sulaiman, “A facile route to improve efficiency of bulk heterojunction solar cell by compositional engineering of PCPDTBT:VOPcPhO, International Conference on Renewable Energy and Environment (ICREE) Toronto, Canada, November 1-3, 2017.
3. **F. Aziz**, K. Sulaiman, Z. Ahmad, M. Hassan Sayyad, Kh. S. Karimov “*Enhancement of electrical properties of vanadyl phthalocyanine derivative by PCBM*” Nanoscience and Nanotechnology for Next Generation, (NanoNG2014), Elazığ, Turkey, August 20-22, 2014.
4. **F. Aziz,** Z. Ahmad, S. M. Abdullah, K. Sulaiman and M. Hassan Sayyad, “Photovoltaic effect in single-junction organic solar cell fabricated using Vanadyl Phthalocyanine soluble derivative” *4th International Conference of Solid State Science and Technology, (ICSSST 2012),* Malacca, Malaysia, December 18-20, 2012.
5. **F. Aziz**, K. Sulaiman, Kh. S. Karimov and M. Hassan Sayyad, “The Influence of Doping of Fullerene Derivative (PCBM) on the Optical Properties of Vanadyl Phthalocyanine complex (VOPcPhO)” *International Conference on Computer, Electrical and Systems Sciences and Engineering (ICCESSE 2011), Bali, Indonesia, October 26‐28, 2011.*
6. **F. Aziz**, K. Sulaiman, M. R. Muhammad, M. Hassan Sayyad, K. S. Karimov and B. Y. Majlis, “Investigation of optical and humidity-sensing properties of vanadyl phthalocyanine-derivative thin films” *KJF 2011:International Conference on Organic Materials for Electronics and Photonics, Gyeongju, Korea, September 15-18, 2011.*
7. **F. Aziz,** K. Sulaiman, M. R. Muhammad, M. Hassan Sayyadand Kh. S. Karimov “Influence of thermal annealing on the structural properties of vanadyl phthalocyanine thin films: A comparative study” *International Conference on Condensed Matter and Materials Physics (ICCMMP2011), Venice, Italy, April 27-29, 2011*.
8. **F. Aziz,** K. Sulaiman, M. R. Muhammad, M. Hassan Sayyad,Kh. S. Karimov and M.S. Fakira “Optical and Electrical Characterization of Solar Cell Based On Vanadyl Phthalocyanine”, *Third International Conference on Functional Materials and Devices (ICFMD 2010), Kuala Terengganu, Malaysia, June 14-17, 2010.*

# REFERENCES:

1. Prof. Dr. Muhammad Hassan Sayyad (PhD, Supervisor)

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