

Prof. Dr. Fayaz Hussain

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SUMMARY

Fayaz Hussain joined the Department of Materials Engineering in 2007, first as a Lecturer, then after Assistant Professor in 2010, and promoted as an Associate Professor in 2020, then again promoted as a Professor and Chairman the Department of Materials Engineering in 2022. Prior to this, he worked three years in metal industry. He is also editorial board member of journals of “Frontiers in Materials”, “Electroactive Materials” and “Advanced Dielectrics”. He has completed his PhD from the University of Sheffield, England, UK, in 2016-2017, worked on “KNN based lead-oxide free piezoelectric ceramics”. This ABO₃ system has been studied from the perspective of optimizing its performance for multilayer actuators; potentially for energy harvesting applications under the supervision of Professor Ian Reaney at the University of Sheffield. To fabricate the multilayers, a novel Wet-Multilayer-Method (WMM) was also developed to overcome the issues of delamination during firing of multilayers actuators. He has authored/co-authored publications in well reputed journals, around **40 papers** including key articles on piezoelectric, capacitor and microwave dielectric ceramics in bulk and multilayers with **468-citations, h-index 11 and i10-index 12** of last five years. Current research interests: Synthesis of Piezoelectric Ceramics and their multilayers, Multiferroics, Thermoelectric Ceramics and Microwave dielectrics. Characterisation Methods: LCR, impedance spectroscopy, d₃₃ meter for piezoelectric coefficient, Vibrating Sample Magnetometer for magnetic properties, XRD Analysis, SEM/ EDX, ferroelectric testing, etc.

ACADEMIC CAREER

- **Ph.D.** (Functional Materials and Devices), The University of Sheffield, Sheffield, England, UK, in 2017.

Ph.D. Synopsis: ‘KNN based lead free piezoelectric ceramics have been studied from the perspective of optimising their performance for multilayer actuators, potentially for energy harvesting applications. To this end, the defect chemistry of KNN has been investigated under different sintering conditions, dopants (acceptors: Mn²⁺, Ti⁴⁺, Sn⁴⁺ in KNN_{50/50} ratio; Donor: Sr²⁺ in KNN_{50/50} ratio; Ta⁵⁺ as an isovalent in KNN_{51/49} ratio; and co-dopants: Bi³⁺ and Zr⁴⁺ in KNN_{50/50} ratio) have been incorporated into KNN to enhance

the piezoelectric performance and prototype multilayers of 10 and 16 layers with inner Pt electrodes have been fabricated to demonstrate the potential of 0.942KNN-0.058BNZ+ZrO₂ for the fabrication of multilayer actuators. This lead-free composition has the potential to replace PZT-4 and PZT-8 in piezoelectric devices for room temperature applications. To fabricate the multilayers, a novel Wet-Multilayer-Method (WMM) was also developed to overcome the issues of delamination during firing of MLCCs’.

- **M.E.** (Materials Engineering) from NED University of Engineering & Technology Karachi Pakistan in 2009.
- **B.E.** (Metallurgy) from Mehran University of Engineering & Technology, Jamshoro Pakistan in 2003.

TEACHING EXPERIENCE

- Professor in Materials Engineering Department of NED University of Engineering and Technology, Karachi (from 11th January 2022 to date).
- Associate Professor in Materials Engineering Department of NED University of Engineering and Technology, Karachi (from 04th August 2020 to 10th January 2022).
- Assistant Professor in Materials Engineering Department of NED University of Engineering and Technology, Karachi (from 22nd June 2010 to 04th August 2020).
- Lecturer in Materials Engineering Department of NED University of Engineering and Technology, Karachi (from 2nd July 2007 to 21st June 2010).

Teaching of following subjects:

- MM-204: ‘Engineering Ceramics and Refractory Materials’
- MY -204: ‘Refractory Materials in Metallurgical Industries’
- MM-302: ‘Crystallography and X-ray Diffraction Techniques’
- MM-402: ‘Design and Selection of Materials’
- MM-406: ‘Electronic, Magnetic and Optical Materials’
- MM-409: ‘Biomedical and Functional Materials’
- MM-502: ‘Production of Ferrous and Non-Ferrous Materials’
- MM-532: ‘Ceramic Engineering’
- MM-699: ‘Advance Materials Characterization Techniques’
- MM-602: ‘Advance Materials and Processes’
- MM-603: ‘Nano Engineering and Smart Materials’
- CT-646: ‘Research Methodologies’

OTHER JOB EXPERIENCE

Assistant Manager: Melting Shop (Ladle Furnace) Peoples Steel Mills Ltd. From June 2004 to June 2007:

- Experience of alloying and refining of different types of Steel Alloys, i.e. extra low carbon, low carbon, medium carbon, high carbon, low alloy, medium alloy and high alloy steels.

Q.C Engineer: (ultrasonic testing), Shashi Steel Pipe Works Pvt. Ltd. From March 2004 to June 2004:

- Worked to check the lamination, internal flaws, voids etc. of steel pipes of different dia.

RESEARCH INTERESTS


- Electroceramics in general
- Piezoelectric Ceramics
- Multilayers Capacitors and Actuators
- Microwave Dielectrics
- Multiferroic Materials

TRAININGS AND WORKSHOPS ATTENDED

- Operational and maintenance training on ‘**Vibrating Sample Magnetometer**’ (VSM-EZ9) from Expert of MicroSense USA, 2019.
- Training on Laser Particle Analyser and Photospectrometer from China, Dec. 2010
- Three Days Certificate course on Solar Energy from CCEE, NED, Dec. 2010.
- Training on Hardness testers of various kinds from Shanghai China, January 2008
- Certificate course on Cathodic Corrosion protection 2009 from NED University
- Certificate course on MATLAB from NED University
- 2- Days Workshop on "Smart Materials" at NCP Islamabad in 2009.
- One Day Workshop on "Nanomaterials and Characterization Techniques" GC University Lahore in 2010.
- 2- Days workshop on "Vacuum and Thin Film Technology" NINVEST, NCP Islamabad in 2010.

CONFERENCES /SEMINAR/SYMPOSIA

1. **Fayaz Hussain**, 2nd, International Symposium on Characterization **22-25 September 2022 Afyonkarahisar/Turkey. (Invited Talk with funding)**
2. **Fayaz Hussain**, Muhammad Imran Khan, Muhammad Tufail, “Electrical and magnetic properties of Fe³⁺ doped SrTiO₃ Ceramics”, Electroceramics XVII conference, Online, **Darmstadt 24-28 August 2020, Germany.**
3. **Fayaz Hussain**, Dawei Wang, Ian Reaney, “A novel multilayer method for low cost fabrication of piezoelectric actuators”, 2019 IEEE International Symposium on Applications of Ferroelectrics (ISAF), EPFL Lausanne **Switzerland, July 14-19, 2019.**
4. Dawei Wang, **Fayaz Hussain**, Amir Khesro, Antonio Feteira, Ye Tian and Ian M Reaney, "Composition and Temperature Dependence of Piezoelectricity in KNN-based Lead-free Ceramics". 2016 Joint IEEE International Symposium on the Applications of Ferroelectrics, European Conference on Applications of Polar Dielectrics, Darmstadt Germany.
5. Shunsuke Murakami, Amir Khesro, **Fayaz Hussain**, Dawei Wang, Derek C Sinclair and Ian M Reaney, "Doping Effects in Lead-free Piezoelectric BT-BF based Ceramics", Sustainable Functional Materials April 2016, Scarborough, UK
6. **Fayaz Hussain**, Iasmi Sterianou, Derek C Sinclair, Ian M Reaney, Semiconductor Behaviour of K_xNa_(1-x)NbO₃ (0.49 ≤ x ≤ 0.51) as a function of P(O₂), Electroceramics-XIV Conference, 16-20 June 2016, Bucharest, Romania.
7. **Fayaz Hussain**, Iasmi Sterianou, Derek C Sinclair, Ian M Reaney, Properties of K_{0.50}Na_{0.50}NbO₃ Sintered in N₂ and Air, Ferroelectrics UK, 17-18 January 2013, IOP, University of Sheffield, Sheffield, UK.
8. Umair Aftab, M. I. Abro, Khanji Harijian, Moazam Baloch, M. Aqeel Bhutto, **Fayaz Hussain**, “Effect Of Ceria On Mic Susceptibility Of Aluminium-Zinc Sacrificial Anode”, Conference: 2nd International Conference on Energy, Environmental and Sustainable Development (EESD 2012), At: Mehran University of Engineering and Technology, Jamshoro, Pakistan.
9. **Fayaz Hussain**, Ashraf Ali, “Elastic and Plastic Properties of Soda Lime Glass by Micro Indentation”, ISAM 2009, Pakistan.



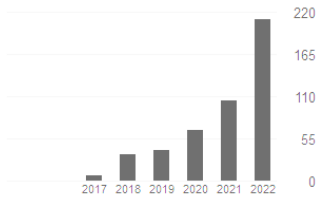
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Mechanical and morphological studies of Sansevieria trifasciata fiber-reinforced polyester composites with the addition of SiO₂ and B₄C P Hanprasad, M Kannan, C Ramesh, A Felix Sahayaraj, I Jenish, ... Advances in Materials Science and Engineering 2022	2	2022
Re-engineering of Waste Products into Useful Construction Materials H Zubairi, A Essani, D Majeed, F Hussain, M Sohail Journal of Characterization 2 (2), 123-133		2022

FUNDED PROJECTS

- PI: Rs.3.5 million from Sindh HEC for “Green Energy Source and Environmentally friendly lead-oxide free piezoelectric ceramics for energy harvesting devices”
- Rs. 3 Million for PhD Project under my supervision
- Rs. 1 Million for ISP, Co-PI
- PI: Rs. 9.8 million for NRPU-2021 on “Environmentally friendly Multiferroic Ceramics for Electronic Applications by cold sintering method”

REWARDS / AWARDS

- More than Rs. 1Million from NEDUET, as financial reward for publishing the research paper since 2020 & 2021
- Best Publication Awards in 2018, 2020 and 2022 by NED Alumni Association of Southern California, USA.
- Best Teacher Award in 2022 by NED Alumni Association of Southern California, USA.

PhD (Students) PROJECTS: Under-Supervision

1. TTB-based like Multiferroic Ceramics (Supervision)
2. Bio-ceramics/glass Coating on implants (Supervision)
3. TTB-based Multiferroic Ceramics (Supervision)
4. Electro-ceramics based (Co-supervision)

ISP OR THESIS PROJECTS M. Engg.

More than 15 projects supervised on electroceramics

EDITORIAL BOARD MEMBER

1. Journal of Frontiers in Materials (JCR, <https://www.frontiersin.org/journals/materials#editorial-board>)
2. Electro-active Materials (Malaysia, <https://www.electroactmater.com/index.php/editorial-board>).
3. Journal of Advanced Dielectrics Editorial Board, Xian Jiaotong University, China, <https://www.worldscientific.com/page/jad/early-career-editorial-board>
4. Guest Editor in “Crystals” Journal

LIST OF PUBLICATIONS

1. Xinhua Chen, Qingliang Xu, **Fayaz Hussain**, Chen Yang, Weiqin Sheng, Xinjiang Luo, Bing Liu, Shikuan Sun, Dawei Wang, Kaixin Song, “[High Thermal Stability and Color Purity of \$\text{Y}_2\text{SrAl}_4\text{SiO}_{12}:\text{Eu}^{3+}\$ Garnet-Variant-Structured Phosphor for Warm White Light LED-Lamp](#)” Crystals, 2022.
2. R Premkumar, K Sathish Kumar, J Maniraj, I Jenish, **Fayaz Hussain**, Nidhal Ben Khedher, Walid Aich, V Suresh, “[Experimental studies on mechanical and thermal properties of polyester hybrid composites reinforced with Sansevieria trifasciata fibers](#)” Advances in Materials Science and Engineering, 2022.
3. P Hariprasad, M Kannan, C Ramesh, A Felix Sahayaraj, I Jenish, **Fayaz Hussain**, Nidhal Ben Khedher, Attia Boudjemline, V Suresh, “[Mechanical and morphological studies of Sansevieria trifasciata fiber-reinforced polyester composites with the addition of \$\text{SiO}_2\$ and B4C](#)” Advances in Materials Science and Engineering, 2022.
4. Hareem Zubairi, Areeba Essani, Doha Majeed, **Fayaz Hussain**, Muhammad Sohail, “[Re-engineering of Waste Products into Useful Construction Materials](#)” Journal of Characterization, 2022.
5. Shehzad Khan, Basit Ali, Muhammad Salman, Raz Muhammad, Majid Khan, **Fayaz Hussain**, Kaixin Song, Dawei Wang, “[Spinel \$\text{M}_0.5\text{Zn}_{0.5}\text{Fe}_2\text{O}_4\$ \(\$\text{M} = \text{Ni, Co, and Cu}\$ \) ferrites for energy storage applications: Dielectric, magnetic and electrochemical properties](#)” Ceramics International, 2022.
6. Chen Yang, Chenli Fan, **Fayaz Hussain**, Zijun Ye, Weiqing Sheng, Kaixin Song, Raz Muhammad, Jun Wu, Qingming Huang, Huanping Wang, Weitao Su, Junming Xu, Shikuan Sun, Dawei Wang “[Sn⁴⁺ induced Bi³⁺ multi-lattice selective occupation and its color-](#)

[tunable emission of La₂MgZrO₆: Bi³⁺, Sn⁴⁺ double perovskite phosphors](#)” *Journal of Alloys and Compounds*, 2022.

7. Weichao Lou, Kaixin Song, **Fayaz Hussain**, Amir Khesro, Jianwei Zhao, Hadi Barzegar Bafrooei, Tao Zhou, Bing Liu, Minmin Mao, Kuiwen Xu, Ehsan Taheri-nassaj, Di Zhou, Shaojin Luo, Shikuan Sun, Huixing Lin, Dawei Wang "Microwave dielectric properties of Mg_{1-8R0}. 2Al₄Si₅O₁₈ (R= Mg, Ca, Sr, Ba, Mn, Co, Ni, Cu, Zn) cordierite ceramics and their application for 5G microstrip patch antenna" *Journal of the European Ceramic Society*, 2022.
8. Chen Yang, Chenli Fan, **Fayaz Hussain**, Weiqing Sheng, Kaixin Song, Jun Wu, Qingming Huang, Weitao Su, Junming Xu, Shikuan Sun, Dawei Wang, "Luminescent ionic lattice occupation and wide tunable emission spectra of La₂MgZrO₆: Bi³⁺, Eu³⁺ double perovskite phosphors for white light LED" *Journal of Rare Earths*, 2022.
9. Raz Muhammad, Haider Ali Shah, **Fayaz Hussain**, Ejaz Ahmed, Wen Lei, Dawei Wang, "Synthesis, structural, dielectric, and magnetic properties of Re₅Ti₄CrO₁₇ (Re= La, Nd)" *Journal of Materials Science: Materials in Electronics*, 2022.
10. Shengkai Zhu, Zhichao Huang, Weichao Lou, Kaixin Song, Amir Khesro, **Fayaz Hussain**, Zhenyu Tan, Xinjiang Luo, Minmin Mao, Lingyun Xue, Ping Xu, Bing Liu, Huixing Lin, Dawei Wang, "[5G microstrip patch antenna and microwave dielectric properties of 4 mol% LiF-MgO-xwt% MTiO₃ \(M= Ca, Sr\) composite ceramics](#)" *Journal of Materials Science: Materials in Electronics*, 2021.
11. Muhammad Salman, Majid Khan, Sumaiya Saleem, Salman Ali, **Fayaz Hussain**, Raz Muhammad, Amir Khesro, Yihan Ling, "[Non-stoichiometric zinc ferrite nanostructures: Dielectric, magnetic, optical and photoelectrochemical properties](#)" *Materials Today Communications*, 2021.
12. M. Xu, C. Fan, C. Yang, K. Song, **F. Hussain**, W. Sheng, J. Wu, H. Wang, W. Su, and Q. Huang, "Lattices selective occupation, optical spectra regulation, and photoluminescence properties of Eu²⁺ activated Ca₉La (PO₄)₇ phosphor," *Journal of Luminescence*, pp. 118197, 2021.
13. Mingtao Ma, Kaixin Song, Yuping Ji, **Fayaz Hussain**, Amir Khesro, Minmin Mao, Lingyun Xue, Ping Xu, Bing Liu, Zhilun Lu, Di Zhou, Dawei Wang, Shikuan Sun, "[5G microstrip patch antenna and microwave dielectric properties of cold sintered LiWVO₆-K₂MoO₄ composite ceramics](#)" *Ceramics International*, 2021
14. H. Qian, C. Fan, **F. Hussain**, K. Song, X. Luo, W. Su, H. Wang, Q. Huang, and L. Yang, "Energy transfer between two luminescent centers and photoluminescent properties of Ca_{4-y}La₆ (AlO₄)_x (SiO₄)_{6-x}O_{1-x/2}: yEu²⁺ apatite structure phosphors," *Journal of Luminescence*, vol. 235, pp. 117991, 2021.
15. W.-B. Li, D. Zhou, W.-F. Liu, J.-Z. Su, **F. Hussain**, D.-W. Wang, G. Wang, Z.-L. Lu, and Q.-P. Wang, "High-temperature BaTiO₃-based ternary dielectric multilayers for

energy storage applications with high efficiency,” *Chemical Engineering Journal*, vol. 414, pp. 128760, 2021.

16. Syed Ali Afzal, **Fayaz Hussain**, Sajid Hussain Siyal, Muhammad Sufyan Javed, Muhammad Saleem, Muhammad Imran, Mohammed A Assiri, Aboud Ahmed Awadh Bahajja, Ayman A Ghfar, Murefah Mana AL-Anazy, Mohamed Ouladsmene, Saad Al-Tamrah, Shafaqat Ali, “[Weight Loss during Calcination and Sintering Process of \$\text{Na}_{0.5}\text{Bi}_{0.5}\text{TiO}_3\text{--Bi}_{1/2}\(\text{Mg}_{2/3}\text{Nb}_{1/3}\)\text{O}_3\$ Composite Lead-Free Piezoelectric Ceramics](#)” *Coatings*, 2021.
17. Sarah Faheem, Muhammad Sohail, **Fayaz Hussain**, Muhammad Maaz, Bilal Abbas, “[Synthesis and Characterization of Chitosan and Graphene Oxide to Form a Nano-Composite Hydrogel for the Removal of Heavy Metal Ions](#)” *Journal of Water Chemistry and Technology*, 2021.
18. R. Iftikhar, A. Ansari, N. N. Siddiqui, **F. Hussain**, and A. Aman, “Structural elucidation and cytotoxic analysis of a fructan based biopolymer produced extracellularly by *Zymomonas mobilis* KIBGE-IB14,” *Carbohydrate Research*, vol. 499, pp. 108223, 2021.
19. W. Lou, K. Song, **F. Hussain**, B. Liu, H. B. Bafrooei, H. Lin, W. Su, F. Shi, and D. Wang, “Bond characteristics and microwave dielectric properties of $(\text{Li}_{0.5}\text{Ga}_{0.5})^{2+}$ doped $\text{Mg}_2\text{Al}_4\text{Si}_5\text{O}_{18}$ ceramics,” *Ceramics International*, vol. 46, no. 18, pp. 28631-28638, 2020.
20. Shu-Zhao Hao, Di Zhou, **Fayaz Hussain**, Jin-Zhan Su, Wen-Feng Liu, Da-Wei Wang, Qiu-Ping Wang, Ze-Ming Qi, “[Novel scheelite-type \$\[\text{Ca}_{0.55}\(\text{Nd}_{1-x}\text{Bi}_x\)_{0.3}\]\text{MoO}_4\$ \(\$0.2 \leq x \leq 0.95\$ \) microwave dielectric ceramics with low sintering temperature](#)” *Journal of the American Ceramic Society*, 2020.
22. A. Khesro, D. Wang, **F. Hussain**, R. Muhammad, G. Wang, A. Feteira, and I. M. Reaney, “Temperature dependent piezoelectric properties of lead-free $(1-x) \text{K}_{0.6}\text{Na}_{0.4}\text{NbO}_3\text{--}x\text{BiFeO}_3$ ceramics,” *Frontiers in Materials*, vol. 7, pp. 140, 2020.
23. **F. Hussain**, A. Khesro, Z. Lu, G. Wang, and D. Wang, “Lead free multilayer piezoelectric actuators by economically new approach,” *Frontiers in Materials*, vol. 7, 2020.
24. **F. Hussain**, A. Khesro, Z. Lu, N. Alotaibi, A. A. Mohamad, G. Wang, D. Wang, and D. Zhou, “Acceptor and donor dopants in potassium sodium niobate based ceramics,” *Frontiers in Materials*, vol. 7, 2020.
25. D. Han, C. Wang, D. Lu, **F. Hussain**, D. Wang, and F. Meng, “A temperature stable $(\text{Ba}_{1-x}\text{Cex})(\text{Ti}_{1-x/2}\text{Mgx}/2)\text{O}_3$ lead-free ceramic for X4D capacitors,” *Journal of Alloys and Compounds*, vol. 821, pp. 153480, 2020.
26. S. H. Abro, **F. Hussain**, M. Sohail, D. Tariq, K. Jawed, R. Sanwal, and M. N. Alghamdi, “Development and Synthesis of Composite Electrode (rGO/G/PANI) for Capacitor from Burnout Battery Powder: Composite Electrode (rGO/G/PANI) for Capacitor,”

Proceedings of the Pakistan Academy of Sciences: A. Physical and Computational Sciences, vol. 57, no. 2, pp. 41-50, 2020.

27. R. Muhammad, S. Khan, **F. Hussain**, and A. Khesro, "Phase evolution and microwave dielectric properties of (Ca/Sr) Nd₄Ti₅O₁₇-based ceramic systems," *Materials Research Express*, 2019.
28. **F. Hussain**, M. Sohail, M. U. Baig, S. Arif, and M. D. Ahmed, "Fabrication of Ultrathin Graphene Oxide Membrane for water purification using Ink-jet printing," *Journal of Space Technology*, vol. 9, no. 1, 2019.
29. **F. Hussain**, A. Khesro, R. Muhammad, and D. Wang, "Effect of Ta-doping on functional properties of K_{0.51}Na_{0.49}NbO₃," *Materials Research Express*, vol. 6, no. 10, pp. 106309, 2019.
30. D. Ahmad, M. Sohail, **F. Hussain**, H. Siddiqui, and M. Yasir, "Synthesis of Cuprous Oxide nano cubes and platelets using both electrodes of copper," *Mehran University Research Journal of Engineering & Technology*, vol. 38, no. 2, pp. 415, 2019.
31. M. Sohail, **F. Hussain**, A. D. Chandio, and M. Sheikh, "High temperature effectiveness of ginger extract as green inhibitor for corrosion in mild steel," *NUST Journal of Engineering Sciences*, vol. 11, no. 1, pp. 26-32, 2018.
32. M. A. Siddiqui, **F. Hussain**, M. S. Hanif, A. A. Mohamad, and M. Tufail, "Effect of Calcination and Sintering Temperatures on Physical Properties of Barium Titanate Ceramic," *Int. J. Electroactive Mater*, vol. 6, pp. 42-47, 2018.
33. **F. Hussain**, I. Sterianou, A. Khesro, D. C. Sinclair, and I. M. Reaney, "p-Type/n-type behaviour and functional properties of K_xNa_(1-x)NbO₃ (0.49 ≤ x ≤ 0.51) sintered in air and N₂," *Journal of the European Ceramic Society*, vol. 38, no. 9, pp. 3118-3126, 2018.
34. S. H. Abro, M. S. Hanif, and **F. Hussain**, "On the Effect of γ-phase transformation kinetics upon microstructure response of Cold Heading Quality Steel," *NUST Journal of Engineering Sciences*, vol. 11, no. 2, pp. 51-55, 2018.
35. Dawei Wang, **Fayaz Hussain**, Amir Khesro, Antonio Feteira, Ye Tian, Quanliang Zhao, Ian M Reaney, "[Composition and temperature dependence of structure and piezoelectricity in \(1-x\)\(K_{1-y}Na_y\)NbO_{3-x}\(Bi_{1/2}Na_{1/2}\)ZrO₃ lead-free ceramics](#)" *Journal of the American Ceramic Society*, 2017.
36. K. Harun, **F. Hussain**, A. Purwanto, B. Sahraoui, A. Zawadzka, and A. A. Mohamad, "Sol-gel synthesized ZnO for optoelectronics applications: a characterization review," *Materials Research Express*, vol. 4, no. 12, pp. 122001, 2017.
37. A. Khesro, D. Wang, **F. Hussain**, D. C. Sinclair, A. Feteira, and I. M. Reaney, "Temperature stable and fatigue resistant lead-free ceramics for actuators," *Applied Physics Letters*, vol. 109, no. 14, pp. 142907, 2016.

- 38. F. Hussain**, "Lead-Free KNN-based Piezoelectric Ceramics," University of Sheffield, 2016. (PhD thesis)
- 39.** U. Aftaba, M. Abroa, K. Harijianb, M. Balocha, M. A. Bhuttoc, and **F. Hussain**, "Effect Of Ceria on MIC Susceptibility Of Aluminium-Zinc Sacrificial Anode," *Energy, Environmental and Sustainable Development (EESD 2012)*, Mehran University of Engineering and Technology, Jamshoro, 2012.
- 40.** S Sami-Ullah, SMH Waqar, **F Hussain**, A Ali, "[Synthesis of single and multi walled carbon nanotubes by improved arc discharge method](#)" Key Engineering Materials, 2012.
- 41. F. Hussain**, and A. Ali, "Elastic and plastic properties of soda lime glass by micro-indentation." pp. 294-300, 2010.

TRAININGS / COURSES AND WORKSHOPS ATTENDED

- One Week Course Training of Auditor in 2021.
- Training on "Vibrating Sample Magnetometer Operation and Maintenance Class" from Micro-Sense USA, January-2019.
- Sheffield University GRAD-school, May-2013.
- Workshops: The Sheffield Teaching Assistant Programme, April-2013.
- Training Course on Radiation Protection for X-Ray Workers, April-2012.
- One Day Workshop on "Nanomaterials and Characterization Techniques" GC University Lahore in 2010.
- Three Days Certificate course on Solar Energy from CCEE, NED, Dec.2010.
- Training on Laser Particle size analyser and photo-spectrometer from China, Dec. 2010.
- 2- Days workshop on "Vacuum and Thin Film Technology" NINVEST, NCP Islamabad in 2010.
- Certificate course on Corrosion protection Management 2009 from NED University.
- 2- Days Workshop on "Smart Materials" at NCP Islamabad in 2009.
- Training on Hardness testers of various kinds from Shanghai China, January 2008.
- Certificate course on MATLAB from NED University, 2007.
- Industrial Gases Hazard and Safety Awareness Course, August 2006.