DR. KHAN MALOOK



Assistant Professor of Analytical Chemistry

Institute of Chemical Sciences, University of Peshawar, Peshawar, KP, Pakistan
Phone: +92-91-9216669 | Cell: +92-346-9195771 | Email: kmalookcrl@uop.edu.pk
Google Scholar: Profile Link | Nationality: Pakistani

PROFESSIONAL SUMMARY

Accomplished Assistant Professor and Analytical Chemist with over 17 years of continuous professional academic, research, and technical laboratory leadership. Expert in the synthesis, characterization, and analytical applications of metal oxides and , metal oxide-conducting polymer nanocomposites for advanced gas sensing, humidity monitoring, and environmental remediation. Proven track record as Principal Investigator on HEC-funded national research grants, manager of sophisticated analytical instrumentation, and author of numerous high-impact peer-reviewed publications.

WORK EXPERIENCE

Assistant Professor — **Nov 2025 – Present**

Institute of Chemical Sciences, University of Peshawar — Peshawar, Pakistan

- Delivering high-quality undergraduate and postgraduate instruction in Analytical Chemistry.
- Leading cutting-edge research projects focused on gas sensors, human breath biomarker monitoring, and biowaste adsorbents.
- Supervising postgraduate thesis research and overseeing departmental advanced chemical analytical infrastructure.

Lecturer / Analytical Chemist — **Feb 2009 – Nov 2025**

Centralized Resource Laboratory (CRL), University of Peshawar — Peshawar, Pakistan

- Operated, calibrated, maintained, and interpreted data across a wide array of high-tech sophisticated laboratory equipment.
- Provided comprehensive analytical services and consultation to postgraduate researchers, faculty, and industry clients.
- Organized and conducted technical hands-on training workshops and seminars on advanced analytical instrumentation.

EDUCATION

Ph.D. in Analytical Chemistry — **2018**

Department of Chemistry, Islamia College Peshawar — Peshawar, Pakistan

- **Dissertation:** Synthesis, characterization, and analytical applications of polypyrrole-metal oxide composites.

M.Phil. in Physical Chemistry (Post-Master Degree) — **2014**

National Center of Excellence in Physical Chemistry, University of Peshawar — Peshawar, Pakistan

- **Dissertation:** Synthesis, characterization and gas sensing properties of uniform fine particles of copper (II) oxide.

M.Sc. in Analytical Chemistry — **2007**

Institute of Chemical Sciences, University of Peshawar — Peshawar, Pakistan

- **Thesis:** Development of extractive spectrophotometric method for quantitative determination of Lidocaine in pharmaceutical formulations.

B.Sc. in Science — **2005**

Gomal University — Dera Ismail Khan, Pakistan

HIGH-TECH INSTRUMENTATION EXPERTISE

- **Spectroscopy & Scattering:** UV/Vis-NIR Spectroscopy (Lambda 1050+, Perkin Elmer), FTIR Spectroscopy (FTIR-8400, Shimadzu), Atomic Absorption Spectrometer (AAnlyst-700, Perkin Elmer), Zetasizer Particle Size & Zeta Potential (ZSU3100, Malvern Panalytical).
- **Chromatography & Mass Spectrometry:** Gas Chromatography-Mass Spectrometry (Agilent 5977B GC/MSD), Gas Chromatography (Clarus 500, Perkin Elmer), High Performance Liquid Chromatography (200 Series & Waters Alliance e2695, Perkin Elmer/Waters).

- **Surface Characterization & Electron Microscopy:** Scanning Electron Microscope (JSM-5910, JEOL), Surface Area & Pore Size Analyzer (2100e, Quantachrome).
- **Thermal Analysis:** Thermogravimetric/Differential Thermal Analyzer (Diamond TG/DTA, Perkin Elmer), Differential Scanning Calorimeter (Diamond DSC, Perkin Elmer).

RESEARCH GRANTS & PROJECTS

Principal Investigator — NRPU Research Grant (Project No. 17228) **Completed**

Higher Education Commission (HEC) of Pakistan Islamabad, Pakistan

- **Project Title:** Fabrication of noble metal decorated metal oxide based sensor for monitoring of human breath biomarkers.
- **Outcome:** Successfully developed highly sensitive and selective gas sensors capable of detecting ultra-trace biomarker levels in simulated exhaled human breath.

RESEARCH PUBLICATIONS (ALL 26 PUBLICATIONS INCLUDED)

[1] A. Kareem, H. Khan, N. Ali, I. Khan, M. Naseem, M. Sultan, F. Khan, M. Ul. Islam, B. M. Khan, K. Malook & A. Khan, 'Pterospermum acerifolium leaves, PAL a low cost bio-based adsorbent for the efficient agricultural waste biomass for removal of noxious bromophenol blue', Arab Journal of Basic and Applied Sciences, 33, 319–339, 2026.

[2] K. Malook, H. Khan, Ak. Ullah, M. Shah, I. Ul. Haque, A. Ahmad, 'Fabrication of a CuO-based gas sensor with high selectivity, sensitivity, and stability for n-butanol detection', Applied Physics A, 132:691, 2026.

[3] W. H. A. Mohsen, A. Hussain, K. Malook et al., 'Self-doped polyaniline/V2O5 nanocomposites for room temperature gas sensing', Journal of Materials Science: Materials in Electronics, 37(12), 958, 2026.

[4] K. Malook et al., 'Assessment of Physical Parameters and Potentially Toxic Elements in Municipal Water Distribution Systems', Journal of Hazardous Materials Advances, Volume 18, May 2025, 100694.

[5] K. Malook, H. Khan, M. Shah, I. Ul. Haque, A. Ahmad, 'Fabrication of Au-decorated V2O5 based sensor for ultra trace level detection of ammonia in an environment resembling human exhaled breath', Journal of Alloys and Compounds, Volume 1010, 5 January 2025, 177089.

[6] K. Malook et al., 'Ecofriendly synthesis of hydroxyapatite from fish scales and its application toward adsorptive removal of Pb(II)', Journal of the Indian Chemical Society, 101, 101175, 2024.

[7] Y. A. Shah, M. Shah, K. Malook, A. Khan, M. Ali, 'Fabrication and Characterizations of Ultra-Sensitive Capacitive/Resistive Humidity Sensor Based on CNT-Epoxy Nanocomposites', Journal of Materials Science, 28, 17211–17224, 2023.

[8] K. Malook, M. Ali, I. Ul. Haque, 'Elucidation of room temperature humidity sensing properties of Mn2O3 particles', Applied Physics A, 127:758, 2021.

[9] K. Malook, I. Ul. Haque, 'Evaluation of essential and non-essential elemental composition of commonly used medicinal plants from district Peshawar, Khyber Pakhtunkhwa, Pakistan', Environmental Science and Pollution Research, 28, 64337–64344, 2021.

[10] K. Malook, 'Orange peel powder, a potential adsorbent for Pb(II) ions removal from water', Theoretical Foundations of Chemical Engineering, 55, 518–526, 2021.

[11] K. Malook, H. Khan, 'Zero Valent Iron/Copper Functionalized Spent Tea as Adsorbent for Decontamination of Cd(II) Ions Contaminated Water', Water Science and Technology, 82, 2552–2561, 2020.

[12] K. Malook, H. Khan, M. Ali, I. Ul. Haque, 'Investigation of room temperature humidity sensing performance of mesoporous CuO particles', Materials Science in Semiconductor Processing, 113, 105021, 2020.

[13] K. Malook, H. Khan, M. Shah, I. Ul. Haque, 'Ammonia sensing behavior of Polypyrrole bimetallic oxide composites', Polymer Composites, 41, 2610–2615, 2020.

[14] H. Khan, K. Malook, M. Shah, 'Synthesis, characterization, and electrical properties of polypyrrole–bimetallic oxide composites', Journal of Applied Polymer Science, 137, 47680, 2020.

[15] K. Malook, I. Ul. Haque, 'Investigation of Aqueous Cr(VI) Adsorption Characteristics of Orange Peels Powder', Protection of Metals and Physical Chemistry of Surfaces, 55, 34–40, 2019.

[16] K. Malook, I. Ul-Haque, M. Khan, M. Ali, 'Polypyrrole-CuO based composites: promotional effects of CuO contents on polypyrrole characteristics', Journal of Materials Science: Materials in Electronics, 30, 3882–3888, 2019.

[17] K. Malook, H. Khan, M. Shah, I. Ul. Haque, 'Highly Selective and Sensitive Response of Polypyrrole–MnO2 Based Composites towards Ammonia Gas', Polymer Composites, 40, 1676–1683, 2019.

[18] H. Khan, K. Malook, M. Shah, 'Polypyrrole/MnO2 composites: synthesis, structural and electrical properties', Journal of Materials Science: Materials in Electronics, 29, 9090–9098, 2018.

[19] K. Malook, H. Khan, M. Shah, I. Ul. Haque, 'Synthesis, characterization and electrical properties of polypyrrole/V2O5 composites', Korean Journal of Chemical Engineering, 35, 12–19, 2018.

[20] H. Khan, K. Malook, M. Shah, 'Highly selective and sensitive ammonia sensor using polypyrrole/V2O5 composites', Journal of Materials Science: Materials in Electronics, 28, 13873–13879, 2017.

[21] K. Akhtar, I. U. Haq, K. Malook, 'Gas sensing properties of semiconducting copper oxide nanospheroids', Powder Technology, 283, 505–511, 2015.

[22] I. U. Haq, K. Akhtar, K. Malook, 'Synthesis and characterization of monodispersed copper oxide and their precursor powder', Materials Research Bulletin, 57, 121–126, 2014.

[23] M. Sirajuddin, Nooruddin, S. Ali, V. McKee, S. Z. Khan, K. Malook, 'Synthesis, Spectroscopic Characterization, Crystal Structure, DNA Interaction Study and in Vitro Biological Screenings of 4-(5-chloro-2-hydroxyphenylamino)-4-oxobut-2-enoic acid', Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, 134C, 244–250, 2014.

[24] M. Ikram, S. Rehman, M. Alic, Faridoon, C. Schulzkeg, R. J. Bakerd, A. J. Blakee, K. Malook, H. Wonge, S. U. Rehman, 'Urease and chymotrypsin inhibitory activities of transition metal complexes of new Schiff base ligand: Kinetic and thermodynamic studies of the synthesized complexes using TG–DTA pyrolysis', Thermochimica Acta, 562, 22–28, 2013.

[25] S. Khan, H. Khan, A. Nasrullah, S. Ahmad, N. Muhammad, M. Bilal, F. U. Khan, S. Badshah, I. Ullah, K. Malook, 'Antiwear Properties of Benzoic Acid in Bitter Rapeseed Oil and Sesame Oil at Low and High Temperature', International Journal of Mechanical and Mechatronics Engineering, 12, 7–12, 2012.

CONFERENCE PRESENTATIONS & ABSTRACTS

(1) Hamayun Khan, K. Malook and M. Shah, 'Polypyrrol-MnO2 Composites: Synthesis, Characterization and Analytical Applications', 5th World Congress on Smart and Emerging Materials, 19-20th April 2018, Dubai (UAE) (pp. 51).

(2) Hamayun Khan, K. Malook and M. Shah, 'Synthesis, Characterization and Analytical Applications of Polypyrrole/Bimetallic Oxide Composites', 5th International Multidisciplinary Research Conference, 'Global Prosperity Through Research & Development', 29-31st October 2019, Shaheed Benazir Bhutto Women University, Peshawar (Pakistan) (pp. 48).

(3) K. Malook, H. Khan, M. Shah, I. Ul. Haque, 'Synthesis, characterization and electrical properties of Polypyrrole /V2O5 composites', 1st International Conference on Emerging Trends in Material Sciences, Center for Material Science, Islamia College Peshawar, Pakistan, 27th February to 1st March, 2018 (pp. 34).

(4) K. Malook, H. Khan, M. Shah, I. Ul. Haque, A. Ahmad, 'Fabrication of Au-decorated V2O5 Based Sensor for Ultra Trace Level Detection of Ammonia in an Environment Resembling Human Exhaled Breath', 4th International Conference of Sciences 'Revamped Scientific Outlook of 21st Century', Rawalpindi Women University, Pakistan, November 12, 2025 (pp. 63).

WORKSHOPS, CONFERENCES & TRAININGS ATTENDED

- First one-week introductory workshop on CRL equipment, CRL, University of Peshawar, Pakistan, 15-20 June 2009 (Resource person).
- 1st Training Course on 'Application of Stable & Radioactive Isotopes in Food, Agriculture and Medicine', Nuclear Institute for Food & Agriculture (NIFA) Tarnab, Peshawar, Pakistan, October 5-9, 2009 (Participant).
- Training Course of Analytical Equipment (HPLC, AAS, GC) by Analytical Measuring System (AMS) Pvt.Ltd (Perkin Elmer), February 8-12, 2010 (Participant).
- Training Course of Analytical Equipment (DSC, TG/DTA, DMA) by Analytical Measuring System (AMS) Pvt.Ltd (Perkin Elmer), February 15-19, 2010 (Participant).
- A two-day workshop on Vacuum and Thin Film Technology, National Centre for Physics, Quaid-e-Azam University, Islamabad, Pakistan, 29-30 July 2010 (Participant).
- 11th International & 23rd National Chemistry Conference, National Centre of Excellence In Physical Chemistry, University of Peshawar, Pakistan, 15-17 October 2012 (Participant).
- 4th Spring Research Poster Exhibition, Institute of Chemical Sciences, University of Peshawar, Pakistan, April 11, 2013 (Presenter).
- 3 Days Indigenous On-Campus Training (IOT) on 'Leadership in Higher Education Institutes', Centre for Human Resource and Career Development, University of Peshawar, Pakistan, 31st August to 2nd September, 2016 (Participant).
- Patent Drafting and Filing of Patent Application, Training and Development Centre, Islamia College, Peshawar, Pakistan in Collaboration with Intellectual Property Organization of Pakistan, May 16, 2017 (Participant).
- 1st International Conference on Emerging Trends in Material Sciences, Center for Material Science, Islamia College Peshawar, Pakistan, 27th February to 1st March, 2018 (Presenter).

- Exhibited research facilities of CRL in the 26th Annual Technical Symposium & Exhibition of Oil and Gas industry of Pakistan, 19-20th November 2019 at Serena Hotel, Islamabad.
- Three days training course on Operation, Maintenance & Calibration of Waters LC product, Alliance e2695 Separation Module, 2489 UV, Fraction Collector III, and Empower 3 software under Kamstec Engineers at CRL, 26-29 April 2021 (Participant).
- Organizer and Resource person in 'One-week training workshop on CRL equipment' held from July 05th-9th, 2021, at Centralized Resource Laboratory, University of Peshawar.
- Five days training on 'Sample preparation, analysis, and data interpretation techniques specific for petroleum biomarkers' at Hydrocarbon Development Institute of Pakistan (HDIP), Islamabad, October 30 to November 3, 2023 (Participant).

PEER REVIEW & EDITORIAL ACTIVITIES

Invited Peer Reviewer for leading international scientific journals:

- Inorganic and Nano-Metal Chemistry (Taylor & Francis)
- ACS Omega (American Chemical Society)
- Sensors and Actuators B: Chemical (Elsevier)
- Water Science and Technology (IWA Publishing)
- Applied Physics A: Materials Science and Processing (Springer)
- Journal of Inorganic and Organometallic Polymers and Materials (Springer)

LANGUAGES & REFERENCES

Languages: English (Good speaking, listening, writing), Urdu (Good speaking, listening, writing), Pashto (Mother tongue)

Prof. Dr. Hamayun Khan
Department of Chemistry
Islamia College Peshawar, Pakistan
Cell: +92-321-9192445
Email: hamayun84@yahoo.com

Prof. Dr. Sher Bahader Khan
Department of Chemistry
King Abdulaziz University, Saudi Arabia
Phone: +966-593709796
Email: drkhanchemist@gmail.com

Dr. Mutabar Shah
Department of Physics
University of Peshawar, Pakistan
Cell: +92-343-9211813
Email: mutabarshah@uop.edu.pk