MADIHA MUMTAZ

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PROFESSIONAL SUMMARY

Motivated postgraduate researcher in Applied Physics with expertise in energy storage devices. Skilled in laboratory research, data analysis, and experimental design. A quick learner and team player, committed to pursuing academia and making meaningful contributions through innovative and impactful research.

EDUCATION

University of Engineering and Technology (UET), Lahore, Pakistan 2022 – 2025
M.Phil in Applied Physics CGPA: 3.338 / 4.0
Thesis Title: Synthesis of $Co(OH)_2$ /rGO nanocomposites for energy storage applications

The University of Lahore (UOL), Lahore, Pakistan 2017 – 2021
Bachelor of Science (BS) in Physics CGPA: 3.16 / 4.0

Relevant Coursework: Physics of Materials, Physics of Advanced Materials, Experimental Techniques (SEM, TEM, XRD, FTIR), Solid State Physics, Nanomaterials, Electrodynamics

SKILLS & COMPETENCIES

Laboratory: Material synthesis, electrode fabrication, electrochemical testing, supercapacitor design, Scanning Electron Microscopy (SEM)
Research Skills: Literature review, experimental design, data analysis, scientific writing
Software: Origin, Gamry, COMSOL Multiphysics, Microsoft Office Suite
Personal Strengths: Analytical thinking, effective communication, teamwork, time and project management

RESEARCH EXPERIENCE

Research Scholar – Pakistan Council of Scientific & Industrial Research (PCSIR), Laboratories Complex Lahore 2024 – 2025

- Synthesized NiMnS/$Co(OH)_2$/rGO nanocomposites using hydrothermal and precipitation methods for application in high-performance supercapacitors.
- Characterized morphology and elemental composition using SEM with EDX, and analyzed crystal structure with XRD to confirm successful composite formation.
- Investigated functional groups and bonding interactions using FTIR and Raman spectroscopy to study structural stability and electrochemical activity.

- Evaluated electrochemical performance through Cyclic Voltammetry (CV) for capacitance, Galvanostatic Charge–Discharge (GCD) for charge–discharge stability, and Electrochemical Impedance Spectroscopy (EIS) for resistance and ion transport behavior.
- Collaborated with senior scientists to optimize nanocomposite properties for advanced energy storage and supercapacitor devices.
- Preparing manuscripts for peer-reviewed publications, including a research paper and thesis on Synthesis of $Co(OH)_2$/rGO nanocomposites for energy storage applications.

PUBLICATIONS

Mumtaz, M., Kalsoom, U., Waleed, A., Nawaz, S., Raza, N., & Potturu, H. V. (2026). Novel NiMnS/Co (OH) $_2$/Graphene oxide hybrid composite for high-performance supercapacitor electrodes. *Ionics*, *32*(4), 4663-4677. https://doi.org/10.1007/s11581-026-07015-y

Mansoor, M. S., Raza, N., Bibi, F., Mumtaz, M., Abbas, A., Haider, F., & Ali, B. (2026). Advances in Chitosan Nanoparticles: A Comprehensive Review of Properties, Synthesis, Characterization, Multidisciplinary Applications, and Future Perspectives. *Journal of Applied Polymer Science*, e70949. https://doi.org/10.1002/app.70949

TEACHING EXPERIENCE

Academic Tutor – UET Lahore 2023 – 2025
- Assisted undergraduate students in Applied Physics courses, labs, and research methods.

Math & Physics Teacher – Safa Academy, Lahore 2022 – 2023
- Taught Physics and Mathematics to intermediate-level students and provided academic support.

Section Head & Teacher – The Message Group of Schools, Mandi Bahauddin 2021 – 2022
- Taught physics and mathematics, supervised academic activities, and supported student development.

CONFERENCES & WORKSHOPS

- **Workshop on Cyclic Voltammetry and its Analysis (CV, GCD, EIS) – Lahore College for Women University**
  Certificate in electrochemical analysis techniques 2024
- **International Conference on Recent Advances in Material Science and Photo-Catalysis (ICRAMP-18) – The University of Lahore**
  Certificate of Recognition for active participation 2018
- **Poster Presentation: Synthesis of $Co(OH)_2$/rGO nanocomposites for energy storage applications – UET Lahore**

Presented research findings from M.Phil thesis at an internal symposium/seminar 2025

CERTIFICATIONS

- IELTS (Academic) – Overall Band 7
- Management Head, Physics Forum – The University of Lahore
- Participation in "Mind ‘O’ Pedia" – Physics Forum,
- Sports: Basketball & Football, Annual Sports Gala 2019, The University of Lahore

ACHIEVEMENTS

- **PEEF Scholarship** – Awarded for outstanding academic performance during undergraduate studies