Farhat Bibi

D/O Amir Rahman
Date of Birth: 20th February, 2000
MPhil Physics from AWKUM, KP, Pakistan
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OBJECTIVE: To design and conduct research in the area of material science, supercapacitors and nanotechnology including synthesis of transition metal oxide heterostructures via wet chemical route, hydrothermal & electrospinning techniques. To study the structural, morphological, elemental, & band gap analysis of heterostructures using XRD, SEM, EDS, FTIR and UV-Vis spectroscopy. Currently, I am also working on synthesis of Novel, Ordered Double Transition Metal MXenes for High Energy Density Asymmetric Supercapacitor's applications.

JOB DESCRIPTION:

Working as Lecturer in Physics, Department of Physics, Women University Mardan, from 19th February, 2024 to till date (Contract).

SUMMARY OF QUALIFICATIONS:

- **MPhil Physics,** Department of Physics, Abdul Wali Khan University Mardan, Khyber Pakhtunkhwa Pakistan.
- **BS Physics,** Department of Physics, Abdul Wali Khan University Mardan, Khyber Pakhtunkhwa Pakistan.
- **Intermediate,** Board of Intermediate & Secondary Education (BISE) Mardan, Khyber Pakhtunkhwa Pakistan.
- **Matric,** Board of Intermediate & Secondary Education (BISE) Mardan, Khyber Pakhtunkhwa Pakistan.

MPHIL: (APRIL-2023)

- Department of Physics, Abdul Wali Khan University Mardan, Khyber Pakhtunkhwa Pakistan. Research work was carried out in National Institute of Laser & Optronics (NILOP), Nilore Islamabad, Pakistan.

THESIS TITLE: **"*Synthesis and characterization of TiO_2/NiO/ZnO Heterostructure for supercapacitor applications*"**

In this project, the essential task was to synthesize TiO_2 fibers, TiO_2/NiO Core-shell fibers, & TiO_2/NiO/ZnO heterostructure fibers via electrospinning technique followed wet chemical route. Second part of this project was to make electrodes of the desired materials using nickel foam as a substrate. These electrodes were then tested for electrochemical properties such as CV, EIS and GCD.

BS PHYSICS PROJECT: Title of BS research project is "***A review on materials and design for piezoelectric energy harvesters***".

FUTURE RESEARCH PROJECTS:

1. Investigation of Novel, Ordered Double Transition Metal MXenes for High Energy Density Asymmetric Supercapacitors.
2. Investigation of core/shell nanofiber's based heterostructures for electrode materials using cyclic voltammeter.
3. Investigation of different transition metal oxides for photocatalysis.

SYNTHESIS TECHNIQUES:

- Developed electrospinning setup for the synthesis of organic/inorganic nanofibers at Nano Physics Laboratory (NPL), AWKUM, KP Pakistan.
- Developed hydrothermal/solvothermal setups for synthesis of inorganic material's nanostructures at Nano Physics Laboratory (NPL), AWKUM, KP Pakistan.

WORK EXPERIENCE:

- One-year Research Internship Experience at National Institute of Lasers and Optronics (NILOP), Nilore, Islamabad, Pakistan.
- Two-months research experience at National Center for Physics (NCP), Islamabad, Pakistan.

STUDENTS SUPERVISION:

- BS Physics Students Supervision at Physics Department, AWKUM (Two groups = 06 students)**.**

- BS Physics Students Supervision at Physics Department, Women University Mardan, (Two groups = 07 students)

Skills:

- Origin software for electrochemical data analysis
- Xpert high score for XRD data analysis
- ImageJ software for SEM image detail information
- Word, Excel, etc
- Endnote for adding references in thesis and manuscripts

PARTICIPATION IN CONFERENCE/SEMINARS:

- 3rd International Conference on **"Advances in Materials Science (AIMS)"**, University of Education, Lahore, Pakistan December 15-16, 2022. (**Participation**)
- 2nd position in **"Science Exhibition Project Expo 2024**", Organized by ORIC & Physics Department on 30th May 2024, AWKUM, KPK, Pakistan.
- Certificate of Appreciation as participant in "**An Introduction to Research in Physics Seminar"** held at Department of Physics, AWKUM on 25th March, 2024.
- Certificate of Appreciation as participant in "**Research in Physics Opportunities and Challenges Seminar"** held at Department of Physics, AWKUM on 7th May, 2024.

LIST OF PAPERS:

[1] **Farhat Bibi**, *et al*, "***A new TiO_2/NiO/ZnO core-shell arrays heterostructure: An energy efficient electrode for battery-supercapacitor hybrid system***" Journal of Alloys & Compounds. **IF = 5.8**
(Under Review)

[2] **Farhat Bibi**, *et al*, ***Investigation of size-dependent electrical, dielectric, and magnetic properties of iron oxide nanostructures***, Materials Chemistry and Physics, Volume 315, (2024) p 128882. **IF = 4.3**
https://doi.org/10.1016/j.matchemphys.2024.128882

[3]. **Farhat Bibi** et al., ***Harnessing the Potential of Type-II Heterostructures: ZnO Nanowire-NiO@TiO_2 Fibers for Enhanced Photocatalytic and Electrochemical Performance in Asymmetric Supercapacitors.*** Journal of Energy Storage. **IF = 8.9**
(Under review)

[4] Farhat Bibi et al., ***Facile and Sustainable Fabrication of TiO_2/Co_3O_4 Core-Shell Fiber Electrodes for Enhanced Electrochemical Performance in Asymmetric Supercapacitors.*** Journal of Energy Storage. **IF = 8.9**
(With Editor)

REFERENCES:

1. Dr. Khizar Hayat:

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