

Muhammad Kamran Ashraf

MPhil Physical Chemistry · Computational Electrocatalysis · Software

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RESEARCH FOCUS

Bifunctional ORR/OER electrocatalysts for zinc–air batteries: Ce-doped NiCo metal–organic frameworks, studied by DFT (Quantum ESPRESSO) and electrochemistry (CV, LSV, EIS, Tafel). Earlier work on conducting-polymer biosensors and green nanoparticle synthesis.

EDUCATION

MPhil, Physical Chemistry — Quaid-i-Azam University, Islamabad 2025 – 2027

Thesis: Ce-doped NiCo-MOF for enhanced bifunctional ORR/OER activity — synthesis and DFT. Supervisor Prof. Dr. Safeer Ahmed; co-supervisor Dr. Zahid Rashid. Coursework CGPA 3.30/4.00.

BS Chemistry (4-year) — University of the Punjab, Lahore 2020 – 2024

Capstone: green synthesis of CaO nanoparticles and a urea-imprinted PANi@CaO biosensor. Mentors Dr. Imran Din and Dr. Adeel Afzal.

F.Sc Pre-Medical — Govt. Post Graduate College Okara (BISE Sahiwal) 2017 – 2019

Grade A+, 960/1100.

Matriculation, Science — Govt. High School 32/2L, Okara 2015 – 2017

Grade A+, 917/1100.

MANUSCRIPTS

- Why the corner is empty: antagonistic requirements in rechargeable zinc–air batteries. Ashraf, Maqbool, Ahmed* — under departmental review.
- Grafting of ethyl acetoacetate onto chitosan with ammonium persulfate (FTIR and B3LYP/6-31G(d) evidence). Rehman†, Ashraf†*, Maqbool — completed manuscript.
- Cerium electronic modulation ($\text{Ce}^{3+}/\text{Ce}^{4+}$) on bimetallic NiCo-MOFs — MPhil thesis research, in progress.

SOFTWARE

QAU Kalam — verified students-only network for QAU, live at qaukalam.me. FastAPI, Neon Postgres, Azure, live selfie check.

Articles Downloader — paper search and retrieval across 9 scholarly APIs, SQLite history.

Quidian — 4K / playlist / subtitle downloader on yt-dlp and aria2c.

Subah TaskBook — offline-first daily task book with rollover and rewards. Electron / PWA.

Humanizer Pro — text naturalisation with a local AI-detection scorer.

ReviewForge, Source Genius, Gmail Zenith and 15+ more on github.com/Kamran5H.

TEACHING

Chemistry Lecturer — Unique Science Academy & High School, Lahore Jan 2024 – Feb 2025

Thermodynamics, kinetics and electrochemistry for F.Sc; supervised titrations and spectrophotometry labs.

Science Teacher — The Educators (Beaconhouse), Okara Jan 2019 – Jan 2022

Chemistry, physics and mathematics for secondary classes; science fairs and lab safety.

SKILLS

Electrochemistry & materials: CV, LSV, EIS, Tafel analysis, chronoamperometry, XRD, FTIR, UV-Vis, SEM.

Programming: Python (NumPy, SciPy, Pandas), TypeScript, Next.js, FastAPI, Playwright, Git, LaTeX.

Computation: DFT (Quantum ESPRESSO, ORCA, Gaussian), ASE, Multiwfn, Avogadro, ChemDraw.

Synthesis: hydrothermal MOF synthesis, sol-gel, in-situ oxidative polymerisation (PANI), green synthesis.

REFERENCES

Prof. Dr. Safeer Ahmed

Professor of Physical Chemistry, QAU Islamabad ·
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Dr. Zahid Rashid

Co-supervisor, Department of Chemistry, QAU
Islamabad