Faizan Raza
Ph.D. Chemical Engineering

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Approved Ph.D. Supervisor by **Higher Education Commission Pakistan (HEC)**
Registered Engineer in **Pakistan Engineering Council (PEC)**
Registered Member of **Institute of Engineers Pakistan (IEP)**

Specialized in developing nanomaterials hybrids for various energy applications in chemical and materials engineering from Hanyang University, South Korea. As well as teaching chemical engineering from undergraduate to PhD level at NEDUET, Pakistan for 5 years with expanding my scope of research in process system engineering by combining experimentation with a simulation environment.

Skills

Material Synthesis • Organic synthesis reactions • Photocatalyst • Electrocatalyst • Origin Pro • MATLAB • ASPEN HYSYS / PLUS

Education

SEP 2012-AUG 2018

Ph.D. Fusion Chemical Engineering/ Hanyang University ERICA Campus, Ansan, South Korea

- **Thesis Title:** Functionalized Transition-Metal Dichalcogenide Nanosheets for Visible Light Photocatalysis and Electrochemical Reactions

JAN 2007-DEC 2010

B.E. Chemical Engineering/ University of Karachi, Karachi, Pakistan

- **Final Year Project:** Production of Biodiesel from Jatropha seeds

Experience

JAN 2022 – PRESENT

Associate Professor Chemical Engineering /NED University of Engineering and Technology

- Taught a variety of undergraduate and graduate courses in chemical engineering with consistently good student evaluations.
- Developed and implemented innovative teaching strategies to enhance student learning outcomes.
- Conducted original research in chemical engineering and published findings in peer-reviewed journals.
- As a class advisor for final-year students provided academic advising and career guidance.
- Served on departmental board of studies (BoS) and CEP faculty board of faculty (BoF) statuary committees to contribute to academic governance and strategic planning.

- Additionally working as OBE coordinator in departmental OBE committee responsible for the implementation of Objective-Based Education (OBE) system as be the guideline by Pakistan Engineering Council (PEC)

APR 2021 – DEC 2022

Manager Research Operations and Development ORIC/NED University of Engineering and Technology

- Monitor and evaluate the effectiveness of research operations and identify opportunities for improvement.
- Provide leadership and guidance to research staff to promote a culture of continuous improvement and learning.
- Develop HEC ORIC scorecard for FY 2020-2021 and FY 2021-22 granting NEDUET "Y" and "W" respectively.
- Organizer of NED Research and Technology showcase 2021 in June 2021
- Organizer of Sindh HEC Research and Technology showcase 2022 in May 2022
- Additionally, was QEC Nominee/Area Coordinator of ORIC NED

MAR 2018 – DEC 2021

Assistant Professor Chemical Engineering /NED University of Engineering and Technology

- The teaching of core chemical engineering subjects- Thermodynamic, Chemical Process Optimization, Natural Gas Engineering, Process Modelling and Simulation.
- Undergrad Final Year Project and Graduate Independent Study Project supervisor
- Organizer of 3rd Applied Process and Materials Engineering Conference @NEDUET in December 2019.
- Member of the Chem. Engr. department OBE team

SEP 2017 – MAR 2018

Head Of Quality Assurance/ ENGINEERS & ENGINEERING Karachi, Pakistan

- Worked as ahead in the Q&A department to check the quality of material of electrical boxes before and after installation of electrical fuses and switches to approve the metal coating quality.

SEP 2012 – AUG 2017

Researcher-Research Assistant/ Nanobiochemistry Lab Hanyang University ERICA

- Taking course work, and carrying out studies and literature review in the fields of semiconductor nanomaterials and heterogeneous catalysis for energy applications
- Conducting experiments with data analysis using various spectroscopies such as UV-Vis, Raman spectroscopy, TEM, AFM etc.
- Writing research articles for heterogenous catalysts and their applications to organic synthesis and electrochemical reactions for submission to international high-profile journals
- Preparing posters for his research and presenting it in local and international conferences

DEC 2011 – JUN 2012

Trainee Engineer/ Al-Ahad Industries

- Worked on a pilot scale project on extraction of essential oils of different natural products by means of solvent extraction using new and innovative method of using supercritical fluids (CO_2) as solvent.
- Designing and optimization of extraction process and their parameters for different raw materials.
- Worked on Scale up of the extraction unit to make it a commercial production unit which includes material and energy balances, process equipment specifications, PFD, and P&ID.

- Trouble shooting of equipment such as pump, compressor, and storage tank for CO2. Also, selection of equipment such as pressure regulator valves, flow control valve and filters for recycled CO_2.

DEC 2010 – DEC 2011

Trainee Engineer/ Prime Packages

- Worked as a trainee engineer in the production of textile grade polyethylene, bag roll sheets and textile packing.

Research Interests

Center for Energy Storage Research (CESR)/ NED University of Engineering and Technology

- Team lead (Co-PI) to develop next generation Li ion batteries and electrolytes, selective membranes, and cathode materials for Li- air batteries.
- Synthesis and functionalization of 2D nanomaterials
- Research of new science for synthesis, designing and modifying physical and chemical properties of nanomaterials
- Nanomaterials supported catalysts for sustainable energy like Hydrogen fuel and organic synthesis.
- Nanoparticles catalysts for visible light photocatalysis, solar paints, electrochemical and photoelectrochemical reactions
- Total approved grant for the CESR is PKR 22.2 million

Process Engineering Analysis and Design (PEAD)/ NED University of Engineering and Technology

- Chemical Process Industry Specially Oil and gas simulation projects using ASPEN HYSYS and APSPEN PLUS
- Using Ionic Liquid database to simulate industrial CO_2 and H_2S absorption and removal from Natural gas and converting them into value-added products using ASPEN PLUS simulation.
- Using conventional Amines and Physical solvents to modify the gas sweeting industrial process for Natural gas by using ASPEN HYSYS simulation.
- Life cycle assessment and techno-economic analysis mixed refrigerant-based processes.

Awards

DEC 2022 – DEC 2024

Research Award (Co-PI)/ Pakistan Science Foundation

- **Project Title:** Cost Effective Synthesis of Tetraethylene Glycol Dimethly Ether (TEGDME) for Development of Highly efficient Energy Storage Device
- Approved grant of PKR 2.2690 million

Aug 2021 – JUL 2022

Research Award (Co-PI)/ Independent Research Project, NEDUET

- **Project Title:** Development of Highly Efficient Novel Cathode Material for Li-Air Batteries
- Approved grant of PKR 0.965 million

OCT 2021

Research Award/ NEDUET

- **Best Researcher Award:** The NED University has approved and sanctioned an amount of Rs.100,000 as Best Researcher Award

SEP 2012-AUG 2017

Scholarship Award/ Higher Education Commission, Pakistan

- **HEC HRDI-UESTPs/UETs Scholarship:** MS leading to PhD at Hanyang University, South Korea.
- Total Scholarship award PKR 6.5 million

Final Year (Design) Projects

2022

- Solvent De-Asphalting for 200,000 Barrels Per Day Refinery Based on Das (UAE) Blend Crude
- Technoeconomic Analysis of Mix Refrigerant Based Process for the Production of LNG
- Evaluation of the Feasible Process Scheme for CO2 Capture from Acid Gas

2021

- Determination the Thermal Properties of Nitrile Rubber and Formulate Low Temperature TG (Glass Transition Temperature) (Industrial Project: MIDAS Safety)
- Indigenous Production of Ethylene Polymer and Chemical (Industrial Project: Engro Polymer and Chemical)
- Gasification of Halophytes to Evaluate its potential for Syngas Production.
- Design and Optimization of Salt Removal Process from Petroleum Oil for Refineries

2020

- Removal of CO2 and H2S Using Aqueous Alkanolamine Solutions
- Acid Gas Cleaning Using DEPG (Dimethyl Ether with Propylene Glycol) Physical Solvent

2019

- Carbon Dioxide Absorption and Separation Using Ionic Liquids

Supervised Master's Thesis

2023

- To Improve Thermal and Mechanical Properties of Carboxylate Nitrile/ Styrene Butadiene Rubber Composite (Industrial Project: MIDAS Safety)

. 2022

- Process Design and Simulation of Metal Nano-particle Synthesis
- A broad Simulation to produce H2-RICH SYNGAS OF BIOMASS Via Air Stream Gasification

Soft Skills

Leadership • Adaptability • Critical Thinking • Analytical Thinking • Teamwork • Public Speaking • Problem solving.

Languages

English-Full Professional Proficiency • Urdu-Native Proficiency • Korean-Elementary Proficiency

Interests

Football • Travelling • Reading Books and Novels • Computer Games • Exercise • Painting.

Publications

1. Park JH†, **Raza F.†**, Jeon SJ, Kim HI, Kang TW, Yim DB, and Kim JH*, "Recyclable N-heterocyclic carbene/palladium catalyst on graphene oxide for the aqueous-phase Suzuki reaction", Tetrahedron Letters, 2014, 55, 3426-3430. (†Co-First Author)

2. **Raza F.,** Park JH, Lee HR, Kim HI, Jeon SJ and Kim JH*, "Visible-Light- Driven Oxidative Coupling Reactions of Amines by Photoactive WS2 Nanosheets", ACS Catalysis, 2016, 6, 2754-275.

3. Lee HR, Park JH, **Raza F**., Yim DB, Jeon SJ, Kim HI, Bong KW and Kim JH*, "Photoactive WS2 nanosheets bearing plasmonic nanoparticles for visible light-driven reduction of nitrophenol", Chemical Communications, 2016, 52, 6150-6153

4. Park JH, **Raza F.**, Jeon SJ, Yim DB, Kim HI, Kang TW and Kim JH*, "Oxygen-mediated formation of MoS x-doped hollow carbon dots for visible light-driven photocatalysis", Journal of Materials Chemistry A, 2016, 4, 14796-14803

5. Jeon SJ, Kang TW, Ju JM, Kim MJ, Park JH, **Raza F.**, and Kim JH*, "Modulating the Photocatalytic Activity of Graphene Quantum Dots via Atomic Tailoring for Highly Enhanced Photocatalysis under Visible Light", Advanced Functional Materials, 2016, 26, 8211-8219

6. **Raza F.,** Yim DB, Park JH, Kim HI, Jeon SJ, and Kim JH*, "Structuring Pd Nanoparticles on 2H-WS2 Nanosheets Induces Extraordinary Photocatalytic Activity under Visible Light", Journal of the American Chemical Society, 2017, 139, 14767–14774.

7. Yim DB, **Raza F.**, Park JH, JH Lee, HI Kim, JK Yang, IJ Hwang and Kim JH*, "Ultrathin WO3 Nanosheets Converted from Metallic WS2 Sheets by Spontaneous Formation and Deposition of PdO Nanoclusters for Visible Light-driven C-C Coupling Reactions", ACS Applied Materials and Interfaces, 2019, 11, 36960-36969.

8. A. Zahoor*, ZK Ghouri*, S. Hashmi, **Raza F.,** S. Ishtiaque, S. Nadeem, I. Ullah, KS. Nahm* "Electrocatalysts for Lithium–Air Batteries: Current Status and Challenges", ACS Sustainable Chemistry & Engineering, 2019, 7, 14288-14320.

9. Adil, M., Zaid, H. M., **Raza F.** and Agam, M. A.* "Experimental evaluation of oil recovery mechanism using a variety of surface-modified silica nanoparticles: Role of in-situ surface-modification in oil-wet system", PLoS ONE, 2020, 7, e0236837.

10. Israr, M., **Raza F.,** Nazar, N., Ahmed, T., Khan, M. F., Park, TJ* & Saim, M. A. B.* "Rapid conjunction of 1D carbon nanotubes and 2D graphitic carbon nitride with ZnO for improved optoelectronic properties", Applied Nanoscience, 2020, 10, 3805–3817.

11. Basit, M. A., **Raza F.,** Sumayya, Karima, G., Ali, I. and Sajid B. "Development of CZTS sensitized TiO2 nanoparticles via p-SILAR: Concomitant salvaging of photocatalytic SnO2 and CZTS", Journal of Materials Science: Materials in Electronics, 2020, 31, 17563–17573.

12. Kazmi, B., **Raza F.,** Taqvi, S.A.A., Awan, Z.H., Ali, S. I. and Suleman, H.* "Energy, exergy and economic (3E) evaluation of CO2 capture from natural gas using pyridinium functionalized ionic liquids: a simulation study", Journal of Natural Gas Science and Engineering, 2021, 90, 103951.

13. Awan, Z.*, Kazmi, B., Hashmi, S., **Raza F.,** Hasan, S. and Yasmin, F. "Process system engineering (PSE) analysis on process and optimization of the isomerization process", Iranian Journal of Chemistry and Chemical Engineering, 2021, 7, 14288-14320.

14. Awan, Z**., Raza F.,** Elsaid, K., Hashmi, S., Butt, F. A. and Ghouri Z. K.* "Synthesis and experimental investigation of δ-MnO2/N-rGO nanocomposite for Li-O2 batteries applications", Chemical Engineering Journal Advances, 2021 7, 100115.

15. Kazmi. B., Taqvi S. A. A*, **Raza F.,** Haider J., Naqvi S.R.,Khan M.S and Ali A.* "Exergy, advance exergy, and exergo-environmental based assessment of alkanol amine-and piperazine-based solvents for natural gas purification", Chemosphere, 2022 307, 136001.

16. Asad S., Awan Z.*, Butt F.A., Hashmi S., **Raza F.,** Ahad I.U., Hakami J., Ullah S., Al-Ahmed A., Khan F and Christy M.* "Recent Advances in Titanium Carbide MXene (Ti3C2Tx) Cathode Material for Lithium–Air Battery", ACS Applied Energy Materials, 2022 5, 11933–11946.

17. Ghadia Ahmed, Faaz Ahmed Butt, **Raza F.,** Saud Hashmi, G Gnana Kumar and Christy M.* "The study of different redox mediators for competent Li–air batteries", Journal of Power Sources, 2022 538, 231379.

18. Zahoor Awan, Asad Akhter Naqvi, Zain Shahid, Faaz Ahmed Butt, **Raza F.,** "Synthesis and Characterization of Graphene sheets from graphite powder by using ball milling", Revista UIS Ingenierías, 2022 21, 71-76.

19. Muhammad Abdul Basit, **Faizan Raza**, Gohar Ali, Amna Parveen, Mahmood Khan, Tae Joo Park "Nanoscale modification of carbon fibers with CdS quantum-dot sensitized TiO2: Photocatalytic and photothermal evaluation under visible irradiation", Materials Science in Semiconductor Processing, 2022 142, 106485

20. Asad A Naqvi, Awan Zahoor, Asif Ahmed Shaikh, Faaz Ahmed Butt, **Faizan Raza**, Inam Ul Ahad "Aprotic lithium air batteries with oxygen-selective membranes", Materials Science in Semiconductor Processing, 2022, 1-14

Online Profile Links

Google Scholar: https://scholar.google.co.kr/citations?user=HSIbm_8AAAAJ&hl=en solving.

ResearchGate: https://www.researchgate.net/profile/Faizan-Raza

ORCiD: https://orcid.org/my-orcid?orcid=0000-0002-2284-455X

References

Will be available on request.