Dr Muhammad Rashid Usman
Professor

Institute of Chemical Engineering & Technology
Engineering Research Centre (Director)
University of the Punjab, Lahore, Pakistan
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More than 23 years of experience in chemical engineering education and research. Doctorate from The University of Manchester in the area of catalysis and reaction engineering for environmental applications. Author of more than 45 journal articles and 4 books with 1300+ Google Scholar citations.

Experience

Professor (Since Sep-2020)
Institute of Chemical Engineering and Technology, University of the Punjab, Lahore, Pakistan
Assistant Professor (Sep-2016 to Sep-2020)
Department of Petroleum and Chemical Engineering, Sultan Qaboos University, Muscat, Oman
Associate Professor (Dec-2013 to Sep-2016)
Institute of Chemical Engineering and Technology, University of the Punjab, Lahore, Pakistan
Assistant Professor (Mar-2005 to Dec-2013)
Institute of Chemical Engineering and Technology, University of the Punjab, Lahore, Pakistan (On study leave: Mar-2007 to Dec-2010)
Lecturer (Jan-2000 to Mar-2005)
Institute of Chemical Engineering and Technology, University of the Punjab, Lahore, Pakistan
PhD Scholar (Apr-2007 to Dec-2010)
School of Chemical Engineering and Analytical Science, The University of Manchester, Manchester, United Kingdom
Visiting Lecturer (Sep-2004 to Aug-2005)
Institute of Biochemistry and Biotechnology, University of the Punjab, Lahore, Pakistan
Internee Engineer (Jun-1997 to Jul-1997)
Ammonia Plant–Reforming, Dawood Hercules Chemicals, Limited, Lahore, Pakistan

Education

PhD Chemical Engineering and Analytical Science (Dec-2010)
School of Chemical Engineering and Analytical Science, The University of Manchester, Manchester, United Kingdom
MSc Chemical Engineering (Nov-2001)
Institute of Chemical Engineering and Technology, University of the Punjab, Lahore, Pakistan
BSc Chemical Engineering (*Gold Medal*, Dec-1999)
Institute of Chemical Engineering and Technology, University of the Punjab, Lahore, Pakistan

Journal Publications

1. Munir, D.; Usman, M.R. **2023**. Bifunctional Metal-Loaded Micro-Mesoporous Zeolites for Waste Plastics Conversion to High Quality Liquid Product. *J. Porous Mater.* Published Online.
2. Akram, M.S.; Usman, M.R. Alhumaidan, F.S. **2023**. Mathematical and Kinetic Study of Houriti-Polanyi Reaction Mechanism for the Methylcyclohexane Dehydrogenation over Various Pt/Al_2O_3 Catalysts. *Commun. Math. Comput. Chem.* 89, 49–71.
3. Mumtaz, F.; Irfan, M.F.; Butt, W.A.; Usman M.R. **2022**. Two-step Optimization to Maximize Liquid Yield from Waste Plastics Mixture by Hydrocracking Process using Hierarchical Zeolite Catalysts. *Int. J. Environ. Sci. Tech.*
4. Usman, M.R. **2022**. Hydrogen Storage Methods: Review and Current Status. *Renew. Sustain. Energy Rev.* 167, 112743.
5. Munir, D.; Usman, M.R. **2022**. Mesoporous HZSM-5 Catalysts for the Conversion of Waste Plastics to Liquid Fuels. *J. Porous Mater.* 29, 783–794.
6. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2021**. Methylcyclohexene and Methylcyclohexadiene Dehydrogenation–Hydrogenation over Pt/Al_2O_3 Catalyst. *Arab. J. Sci. Eng.* 46, 6635–6643.

7. Mumtaz, F.; Irfan, M.F.; Usman, M.R. **2021**. Synthesis Methods and Recent Advances in Hierarchical Zeolites: A Brief Review. *J. Iran Chem. Soc.* 18, 2215–2229.
8. Akram, M.S.; Aslam, R.; Alhumaidan, F.S.; Usman, M.R. **2020**. An Exclusive Kinetic Model for the Methylcyclohexane Dehydrogenation over Alumina-Supported Pt Catalysts. *Int. J. Chem. Kinet*. 52, 415–449.
9. Munir, D.; Amer, H.; Aslam, R.; Bououdina, M.; Usman, M.R. **2020**. Composite Zeolite Beta Catalysts for Catalytic Hydrocracking of Plastic Waste to Liquid Fuels. *Mat. Renew. Sust. Energy*. 9, 11–13.
10. Usman, M.R.; Shahid, Z.; Akram, M.S.; Aslam, R. **2020**. Densities and Thermal Expansion Coefficients of Pure Methylcyclohexane, 1-Methylcyclohexene, 4-Methylcyclohexene, 1-Methyl-1,4-cyclohexadiene, and Toluene and Binary Mixtures of Methylcyclohexane and Toluene at 283.15 K to 358.15 K and 1 atm. *Int. J. ThermoPhys.* 41, 44.
11. Usman, M.R.; Munir, D. **2020**. Waste Plastics to Liquid Fuels over Al-Impregnated Zeolite Beta Catalyst. Int. J. Mater. Sci. Eng. 8, 32–37.
12. Munir, D.; Usman, M.R. **2018**. Catalytic Hydropyrolysis of a Model Municipal Waste Plastic Mixture over Composite USY/SBA-16 Catalysts. *J. Ana. Appl. Pyrolysis*. 135, 44–53.
13. Mateen, A.; AlOtaibi, F.M.; Usman, M.R. **2018**. Environmentally Friendly Fuel by n-Heptane Isomerization: Kinetics of Catalyst Deactivation. *Int. J. Chem. Eng. Appl.* 9, 176–179.
14. Irfan, M.F.; Usman, M.R.; Rashid, A. **2018**. A Detailed Study of Heterogeneous, Homogeneous and Nucleation Models for Dissolution of Waste Concrete Sample for Mineral Carbonation. *Energy*. 158, 580–591.
15. Chawla, M.; Rafiq, S.; Jamil, F.; Usman, M.R.; Khurram, S.; Ghauri, M.; Muhammad, N.; Muhtaseb, A.H.; Aslam, M. **2018**. Hydrocarbons Fuel Upgradation in the Presence of Modified Bi-functional Catalyst. *J. Clean. Prod*. 198, 683–692.
16. Munir, D.; Irfan, M.F.; Usman, M.R. **2018**. Hydrocracking of Virgin and Waste Plastics: A Detailed Review. *Renew. Sustain. Energy Rev.* 90, 490–515.
17. Munir, D.; Abdullah; Piepenbreier, F.; Usman, M.R. **2017**. Hydrocracking of a Plastic Mixture over Various Micro-Mesoporous Composite Zeolites. *Powder Tech*. 316, 542–550.
18. Khawaja, S.Y.; Usman, M.R.; Nasif, M.; Akram, M.S.; Afzal, W.; Akhtar, N.A. **2017**. Mass Transfer Efficiency of a Tall and Low Plate Free Area Liquid Pulsed Sieve-Plate Extraction Column. *Int. J. Ind. Chem.* 8, 397–410.
19. Shahid, M.Z.; Usman, M.R.; Akram, M.S.; Khawaja, S.Y.; Afzal, W. **2017**. Interfacial Tension for Various Organic-Water Systems and Study of the Effect of Solute Concentration and Temperature. *J. Chem. Eng. Data.* 62, 1198–1203.
20. Ghouri, A.S.; Usman, M.R. **2017**. Synthesis of Zeolite-Zeolite (MFI-FAU) Composite Catalysts for the Isomerization of n-Hexane. *J. Chem. Soc. Pakistan* 39, 919–933.
21. Munir, D.; Usman, M.R. **2016**. Synthesis and Characterization of Mesoporous Hydrocracking Catalysts. *IOP Conf. Series: Mat. Sci. Eng.* 146, 1–7.
22. Usman, M.R.; Alotaibi, F.M. **2016**. Unified Kinetics of n-Heptane Hydroisomerization over Various Pt/Zeolite Catalysts. *Prog. React. Kinet. Mec.* 41, 177–192.
23. Aslam, R.; Usman, M.R.; Irfan, M.F. **2016**. A Comparative Study of LHHW and ER kinetic models for NO Oxidation over Co_3O_4 Catalyst. *J. Environ. Chem. Eng.* 4, 2871–2877.
24. Usman, M.R.; Cresswell, D. **2015**. Prototype Reactor Simulation for On-board Use of Hydrogen in a Hybrid MTH (Methylcyclohexane-Toluene-Hydrogen)-Gasoline System and a Simplified Dynamic Modeling for the Startup. *Chem. Eng. Res. Des*. 104, 125–138.
25. Ahmad, M.; Amin, A.; Abdullah; Akram, M.S.; Usman, M.R. **2015**. Characterization and Rheological Behavior of Various Pakistani Crude Oils. *Braz. J. Pet. Gas*. 9, 85–94.
26. Usman, M.R.; Alotaibi, F.M.; Aslam, R. **2015**. Dehydrogenation-Hydrogenation of Methylcyclohexane-Toluene System on 1.0wt% Pt/Zeolite Beta Catalyst. *Prog. React. Kinet. Mec.* 40, 353–366.
27. Akram, M.S.; Munir, D.; Usman, M.R. **2014**. Associative Adsorption Kinetics: A Novel Kinetic Model for the Dehydrogenation of Methylcyclohexane. *Prog. React. Kinet. Mec.* 39, 404–417.

28. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2014.** Mathematical Modeling of a Laboratory Methylcyclohexane Dehydrogenation Reactor and Estimation of Radial Thermal Conductivities and Wall Heat Transfer Coefficients. *Chem. Eng. Comm*. 201, 1240–1258.
29. Usman, M.R.; Aslam, R. **2014**. The Dehydrogenation of Methylcyclohexane for On-board Hydrogen Use: Initial Rate Kinetics over 1.0 Wt% Pt/γ-Al_2O_3 Catalyst. *Arab. J. Sci. Eng.* 39, 615–620.
30. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2013.** Dehydrogenation of Methylcyclohexane: Parametric Sensitivity of the Power Law Kinetics. *ISRN Chem. Eng.* 2013. Article ID 818953, 1–7.
31. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2013.** Dehydrogenation of Methylcyclohexane for On-board Hydrogen Use: Catalyst Development and Performance. *J. PIChE* 41, 13–20.
32. Usman, M.R.; Cresswell, D.L. **2013**. Options for On-board Use of Hydrogen Based on the Methylcyclohexane-Toluene-Hydrogen-System. *Int. J. Green Energy* 10, 177–189.
33. Khawaja, S.Y; Usman, M.R.; Khan, S.; Afzal, W.; Akhtar, N.A. **2013**. Dispersed Phase Holdup in a Tall and Low Plate Free Area Liquid Pulsed Sieve-Plate Extraction Column. *Sep. Sci. Tech*. 48, 175–182.
34. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2012**. Selectivity of the Formation of Ring Closed Products and Methylcyclohexenes in the Dehydrogenation of Methylcyclohexane to Toluene. *ISRN Chem. Eng.* 2012. Article ID 818953, 1–7.
35. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2012**. Detailed Reaction Kinetics for the Dehydrogenation of Methylcyclohexane over Pt Catalyst. *Ind. Eng. Chem. Res.* 51, 158–170.
36. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2011**. By-Products Formation in the Dehydrogenation of Methylcyclohexane. *Pet. Sci. Tech.* 29, 2247–2357.
37. Usman, M.R.; Aslam, R.; Alotaibi, F. **2011**. Hydrogen Storage in a Recyclable Organic Hydride: Kinetic Modeling of Methylcyclohexane Dehydrogenation over 1.0 wt% Pt/θ-Al_2O_3. *Energy Sources A* 33, 2264–2271.
38. Usman, M.R. **2011**. Catalytic Dehydrogenation of Methylcyclohexane over Monometallic Catalysts for On-board Hydrogen Storage, Production, and Utilization. *Energy Sources A* 33, 2231–2238.
39. Usman, M.R. **2011**. Methylcyclohexane Dehydrogenation over Commercial 0.3 wt% Pt/Al_2O_3 Catalyst. *Proc. Pak. Acad. Sci.* 48, 13–17.
40. Usman, M.R.; Hussain, S.N.; Asghar, H.M.A.; Sattar, H.; Ijaz, A. **2011**. Liquid-Liquid Extraction of Acetic Acid from an Aqueous Solution Using a Laboratory Scale Sonicator, *J. Quality and Tech. Managem.* 7, 115–121.
41. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2011**. Validity of Sinfelt's Kinetic Model for the Dehydrogenation of Methylcyclohexane, *J. PIChE* 39, 1–12.
42. Awan, J.A.; Usman, M.R.; Khan, R.U.; Richon, D. **2011**. Electrical Conductivity of n-Propylmercaptan (n-PM) in Methyldiethanolamine (MDEA) Aqueous Solutions at 303 K. *J. PIChE* 39, 13–20.
43. Khwaja, S.Y.; Usman, M.R.; Khan, S.; Afzal, W.; Akram, M.S.; Khan, R.U.; Akhtar, N.A. **2011**. On the Factors Influencing the Hydrodynamic Performance of a Pulsed Sieve-Plate Extraction Column: Dispersed Phase Holdup. *J. Fac. Eng. Tech.*, 1–11.
44. Irfan, M.F.; Usman, M.R.; Kusakabe, K. **2011**. Coal Gasification in CO_2 Atmosphere and Its Kinetics Since 1948: A Brief Review. *Energy* 36, 12–40.
45. Usman, M.R.; Hussain, S.N.; Asghar, H.M.A.; Sattar, H.; Afzal, W. **2009**. Drop Size in a Liquid Pulsed Sieve-Plate Extraction Column. *Braz. J. Chem. Eng.* 26, 677–683.
46. Usman, M.R.; Rehman, L.; Bashir, M. **2008**. Drop Size and Drop Size Distribution in a Pulsed Sieve-plate Extraction Column. *Proc. Pak. Acad. Sci.* 45, 41–46.
47. Usman, M.R.; Rehman, L.; Bashir, M.; Butt, M.A. **2006**. Mass Transfer Performance in a Pulsed Sieve-Plate Extraction Column. *Proc. Pak. Acad. Sci.* 43, 173–179.

Books

1. Usman, M.R. **2022**. Thermodynamic Modeling of Fluids and Fluid Mixtures: Step-by-Step Problem-Solving using Cubic Equations of State. A-One Publishers (255 pages).
2. Usman, M.R. **2017**. Short Handbook of Mathematical Formulas for Chemical Engineers. Create Space (94 pages).

3. Usman, M.R. **2015**. Comprehensive Dictionary of Chemical Engineering. Lulu Publishing (576 pages).
4. Usman, M.R.; Aslam, R.; Saleem, M. **2015**. Chemical Engineering Terminology. Rev. Ed. Lulu Publishing (543 pages).

Conference Proceedings

1. Usman, M.R. **2023**. Hydrogen Storage in Liquid Organic Hydrogen Carriers: Recent Development and Practical Issues. International Conference on Science, Engineering and Technology, February 22, 2023, Dera Ghazi Khan, Pakistan (Keynote Speaker)
2. Khawaja, S.; Usman, M.R.; Aslam, R.; **2022**. Development and Simulation of a Methanol Production Plant from CO_2 Hydrogenation using Captured CO_2 Considering Cost Effectiveness. International Conference of Chemical Engineering, March 24-25, 2022, Lahore, Pakistan. (Oral Presentation by my PhD Worker)
3. Akram, M.S.; Usman, M.R. **2022**. Design and Modeling of a Novel Reactor-Heat Exchanger System for the Dehydrogenation of Methylcyclohexane. International Conference of Chemical Engineering, March 24-25, 2022, Lahore, Pakistan. (Oral Presentation by my Co-Worker)
4. Usman, M.R.; Munir, D. **2020**. Waste Plastics to Liquid Fuels over Al-Impregnated Zeolite Beta Catalyst. 9th International Conference on Clean and Green Energy, February 10–12, 2020, Barcelona, Spain. (Oral Presentation, **Best Presentation Award**, Published in International Journal of Material Science and Engineering.
5. Usman, M.R.; Mateen, A. **2018**. Environmentally Friendly Fuel by n-Heptane Isomerization: Kinetics of Catalyst Deactivation. 9th International Conference on Environmental Science and Technology, June 20–22, 2018, Prague, Czech Republic. (Oral Presentation, **Best Presentation Award**, Published in International Journal of Chemical Engineering and Applications).
6. Munir, D., Usman, M.R. **2017**. Investigating Hydrocracking of Waste Plastic Mixture Using Mesoporous Beta Catalysts, 67th Canadian Chemical Engineering Conference, October 22–25, 2017**,** Edmonton, Canada. (Poster Presentation by My PhD Student).
7. Usman, M.R.; Akram, M.S. **2017**. Simulation of a Hydrogen Fueled Mobile Power Plant Based on a Sustainable Organic Hydride, 10th International Conference on Thermal Engineering: Theory and Applications, February 26–28, **2017**, Muscat, Oman (Oral Presentation).
8. Munir, D.; Aslam, R. Usman, M.R. **2016.** Investigating Hydrocracking of Actual Waste Plastics Mixture Using Composite Mesoporous Zeolite Catalysts, 6th Symposium on Engineering Sciences, December 21–22, **2016**, Lahore, Pakistan (Oral Presentation by My PhD Student).
9. Fareed B.; Aslam, R.; Usman. M.R. **2016**. Investigation of zeolite catalyst for cracking of diesel, 6th Symposium on Engineering Sciences, December 21–22, **2016**, Lahore, Pakistan (Oral Presentation by My MS Student).
10. Munir, D.; Usman, M.R. **2016**. Hydrocracking of a Plastic Mixture over Various Micro-mesoporous Composite Zeolites, Fluidization XV, May 22–26, 2016, Quebec, Canada (Oral Presentation by My PhD student).
11. Usman, M.R. **2015**. Hydrogen Storage in Recyclable Organic Hydride: The Dehydrogenation of Methylcyclohexene, 3rd International Chemical Engineering and Chemical Technologies Conference (CHEMTECH '15), November 30–December 1, 2015, Istanbul, Turkey (Oral Presentation).
12. Munir, D.; Usman, M.R. **2015**. Synthesis and Characterization of Mesoporous Hydrocracking Catalysts, 14th International Symposium on Advanced Materials 2015, October 12–16, 2015, Islamabad, Pakistan (Oral Presentation by My PhD Student).
13. Usman, M.R.; Alotaibi, F.M. **2014**. Kinetics of n-Heptane Hydroisomerization over Pt/Zeolite Catalysts, The 23rd International Symposium on Chemical Engineering (ISCRE 23) and 7th Asia-Pacific Chemical Reaction Engineering Symposium (APCRE 7), September 07–10, 2014, Bangkok, Thailand (Oral Presentation).
14. Khawaja, S.Y; Usman, M.R.; Afzal, W.; Akhtar, N. **2014**. Mass Transfer Performance of a Tall and Low Plate Free Area Liquid Sieve-Plate Pulsed Extraction Column. First International Young Engineers Convention, April 18–20, 2014, Lahore, Pakistan.

15. Usman, M.R. **2013**. Dehydrogenation-Hydrogenation of the Methylcyclohexane-Toluene System on a Pt/Zeolite Beta Catalyst, 2nd International Conference on Chemical and Process Engineering, June 8–9, 2013, Kula Lumpur, Malaysia (Oral Presentation).
16. Aslam, R.; Usman, M.R.; Muhammad F. Irfan. **2012**. Kinetic Modeling of NO Oxidation to NO_2 over Cobalt Oxide Catalyst International Conference on Engineering Sciences, March 29–30, 2012, Lahore, Pakistan (Oral Presentation by my Co-worker).
17. Haider, B.; Usman, M.R. **2012**. Densities and Volumetric Properties of Various Pure and Mixed Solvents, International Conference on Engineering Sciences, March 29–30, 2012, Lahore, Pakistan (Oral Presentation by my MS student).
18. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2012**. Dehydrogenation of Methylcyclohexane: Kinetics and Reactor Modeling. 14th Asia-Pacific Confederation of Chemical Engineering Congress, February 21–24, 2012, Singapore (Oral Presentation).
19. Khawaja, S.Y; Usman, M.R.; Afzal, W.; Akhtar, N. **2011**. On the Factors Influencing the Performance of a Pulsed Sieve-Plate Extraction Columns: Holdup and Drop Size Distribution, 4th Symposium on Engineering Sciences, March 1, 2011, Lahore, Pakistan (Oral Presentation by My PhD Student, Published in J. Fac. Eng. Tech.).
20. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2010**. Kinetics of Methylcyclohexane Dehydrogenation for On-board Hydrogen Storage and Utilization, 2nd Asia Pacific Conference on Ionic Liquids and Green Processes, September 7–10, 2010, Dalian, China (Oral Presentation).
21. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2010.** Catalytic Dehydrogenation of Methylcyclohexane for the On-board Hydrogen Storage and Supply, AIChE Spring National Meeting, March 21–25, 2010, San Antonio, USA (Not attended).
22. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2009**. Methylcyclohexane Dehydrogenation—A Convenient Way for Hydrogen Storage, AIChE Annual Meeting, November 08–13, 2009, Nashville, USA (Not attended).
23. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2009**. On-board Hydrogen Storage: Kinetics of Methylcyclohexane Dehydrogenation, CEAS Postgraduate Student Conference, June 06, 2009, University of Manchester, United Kingdom (Poster presentation).
24. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2008**. Dehydrogenation of Methylcyclohexane for On-board Hydrogen Storage, Applied Catalysis: Towards Sustainable Chemical Industry, November 12, 2008, Bath, United Kingdom (Poster presentation).
25. Usman, M.R.; Cresswell, D.L.; Garforth, A.A. **2008**. Catalytic Dehydrogenation of Methylcyclohexane in Pursuit of Successful MTH-System, Graduate Research Conference, September 17, 2008, University of Manchester, United Kingdom (Poster presentation).

Research Grants

1. Pakistan Science Foundation/TUBITAK III (2021–2023, in Progress)
   Energy Storage through Carbon Dioxide Conversion to Methanol
   Equivalent to US $62125 (as Principal Investigator)
2. Research Project University of the Punjab, Lahore (2021–2022)
   Designing Zeolites for the Cracking of Heavy Oil Factions
   Equivalent to US $1675 (as Principal Investigator)
3. Deanship of Research Grant, Sultan Qaboos University (01-Sep-2019)
   Conversion of Heavy Naphtha to Environmentally Friendly Gasoline: Kinetics and Reactor Design
   Equivalent to US $7790 (as Principal Investigator)
4. Internal Grant, Sultan Qaboos University (30-Jan-2018)
   Catalytic and Hydrocracking of Waste Plastics to High Quality Liquid Fuels
   Equivalent to US $10650 (as Principal Investigator)
5. National Research Grant for Universities, Higher Education Commission of Pakistan (27-Dec-2012)
   Hydrocracking of Waste Plastics
   Equivalent to US $110745 (as Principal Investigator)
6. FMC United
   Dehydrogenation of Methylcyclohexane over Metal Supported Mesoporous Alumina
   Equivalent to US $225000 (as Principal Investigator)

7. Research Project University of the Punjab, Lahore (2014–2015)
   Catalytic coprocessing of local coal and waste plastics
   Equivalent to US $2000 (as Principal Investigator)
8. Research Project University of the Punjab, Lahore (2013–2014)
   Liquefaction of coal-plastics blends for fuels
   Equivalent to US $1500 (as Principal Investigator)
9. Financial Assistance Chakwal Group of Industries, Lahore, Pakistan (2011–2014)
   Factors Influencing the Extraction Efficiency in a Pulsed Sieve-Plate Extraction Column
   About US $15,000 (as Co-Investigator)
10. Research Project University of the Punjab, Lahore (2010–2011)
    Separation of pollutants from coal burning system using green solvents
    Equivalent to US $1250 (as Principal Investigator)
11. Research Grant (10% Overseas Scholarships Program, GRE based) by Higher Education Commission of Pakistan for PhD studies at University of Manchester, Manchester, United Kingdom
    Kinetics of Methylcyclohexane Dehydrogenation and Reactor Simulation for "On-board" Hydrogen Storage (as PhD Scholar)

Supervision of PhD Chem Eng Students

1. Saman Khawaja: Conceptual Process Design and Reactor Simulation for Methanol from Captured Carbon Dioxide (Principal Supervisor, **2023**, In process)
2. Dureem Munir: Catalytic Hydrocracking of Waste Plastics to Liquid Fuels (Principal Supervisor, **2018**)
3. Muhammad Sarfraz Akram: Kinetic Study and Reactor Simulation of Methylcyclohexane Dehydrogenation Reaction for a Mobile Power Plant (Principal Supervisor, **2018**)
4. Khawaja Shahzad Younus: Factors Influencing the Extraction Efficiency in a Pulsed Sieve-Plate Extraction Column (Co-Supervisor, **2014**)

Supervision of MSc Chem Eng Students

1. Saba Siddiqa: Design and Economic Analysis of a Hydrogen Power Plant utilizing Methylcyclohexane as a Recyclable Organic Hydride (In process, **2023**)
2. Mahnoor Moeen: Development and Characterization of Quaternary Mixed Oxide Catalysts for CO_2 Hydrogenation to Methanol (In process, **2023**)
3. Sarmad Mumtaz: Comparative Study of Equations of State for Methanol-Water System over a Wide Range of Pressure and Temperature (In process, **2023**)
4. Shadab Rehman: Synthesis of Cu-based Catalysts for Methanol Synthesis from CO_2 Hydrogenation (Co-Supervisor, **2023**)
5. Salim Bawain: Ring Opening of Polycyclic Aromatic Hydrocarbons over Cr-Beta Zeolites for Improving Diesel Quality (**2020**)
6. Shaima AlKhayari: Study of Volumetric Properties and CO_2 Loading in Non-aqueous Binary Mixture of Diethanolamine and Dimethylformamide (Co-Supervisor, **2020**)
7. Khalid AlHatmi: Energy Considerations in Amine Unit (**2019**)
8. Awais Sattar Ghouri: Synthesis of Zeolite-Zeolite (MFI-FAU) Composite Catalysts for the Isomerization of n-Hexane (**2016**)
9. Sidra Saqib: Simulation of a Fixed Bed Reactor for Dimethylether Production from Methanol Dehydration (**2016**)
10. Muhammad Usman: Selective Hydro-decyclization of Naphthenic Compounds (Decalin) using Mordenite based Bifunctional Catalyst (**2016**)
11. Mahmood Khan: Designing and Simulation of a Fixed Bed Reactor for Ethylbenzene Production (**2016**)
12. Hammad Saulat: Thermophysical Properties of 1-Ethyl-3-Methyl Imidazolium Iodide and 1-Butyl-2-3-Dimethyl Imidazolium Chloride by Using Analytical Density (**2016**)
13. Waseem Raza: Thermophysical Properties of Imidazolium Based Ionic Liquids with Different Solvents (**2016**)
14. Muhammad Chawla: Ring Opening of Decalin using Modified Mordenite Catalyst (**2016**)
15. Shahbaz Mushtaq: Process and Reactor Simulation of the Fast SCR Process (**2016**)
16. Bilal Ahmad: Reactor Simulation for the Vapor Phase Hydrogenation of Toluene (**2016**)
17. Aizaz Mateen: Deactivation Kinetics of n-Heptane Hydroisomerization over Various Pt/Zeolite Catalysts (**2016**)
18. Mohsin Ali Raza: Decalin Dehydrogenation for the Hydrogen Storage Applications (**2016**).

	19. Rana Muhammad Bakhtaj : Hydrocracking of Polystyrene on Modified Zeolite Beta catalysts (**2015**) 20. Muhammad Farooq: Dehydrogenation of Methylcyclohexane over Alumina Supported Nickel Oxide Catalyst (**2015**) 21. Zona Rauf: Kinetic Modeling of Hydroisomerization of n-Heptane Using Pt over Beta Zeolite Catalyst (**2015**) 22. Madiha Rashid: Kinetic Modeling of Hydroisomerization of n-Heptane over Pt/Zeolite-Y Catalyst (**2015**) 23. Muhammad Adeel Ahmad: Parametric Study of n-Heptane Hydroisomerization Process Using Aspen HYSYS (**2014**) 24. Abdullah: High Pressure Pyrolysis of Waste High Density Polyethylene (**2014**) 25. Ahmed Hassan Khan: Simulation of the Vapor Phase Hydrogenation of Toluene (**2014**) 26. Muhammad Ali bin Muzaffar: Parametric Study of Methylcyclohexane Dehydrogenation Reaction in a Simulated Plug Flow Reactor (**2014**) 27. Abdulhannan Zahid: Simulation of the MTH (Methylcyclohexane-Toluene-Hydrogen) System to Produce Hydrogen as Fuel for the Stationary Application (**2013**) 28. Muhammad Ahmed: Characterization and Rheological Behavior of Selected Pakistani Crude Oils (**2012**) 29. Talat Mahmood: Removal of Methylene Blue from Textile Waste Using Used Tea as Potential Low Cost Adsorbent (**2012**) 30. Bilal Haider: Experimental Study and Modeling of Volumetric Properties of Liquid Mixtures at Atmospheric pressure (**2012**)
Experimental Facilities Developed and Maintained	Facilities for synthesis of catalysts, for carrying out reactions in high pressure batch reactors and continuous fixed bed catalytic reactors, and for analyzing the reaction products are developed and maintained.
Computer Skill	Decent knowledge of: ○ Aspen HYSYS Simulation ○ MATLAB Programming ○ Regression of Data and Plotting (in SigmaPlot, MS Excel, PolyMath Plus) ○ Producing Drawings (in MS Visio) ○ Data Management and Spreadsheeting (in MS Excel) ○ Preparing Slides (in MS Power Point) ○ Writing Documents and Reports in a Word Processor (in MS Word)
Seminars and Lectures Delivered	○ Hydrogen Storage and Transportation through Liquid Organic Hydrogen Carriers Invited Speaker, 28th Symposium on "New Technologies for Hydrogen Storage", June 24, 2023, The Pakistan Academy of Engineering, Karachi, Pakistan (Online) ○ Hydrogen Storage in Liquid Organic Hydrogen Carriers: Recent Development and Practical Issues Keynote Speaker, International Conference on Science, Engineering and Technology, February 22, 2023, Dera Ghazi Khan, Pakistan ○ Freeware and Open Source Software for Process and Allied Engineers Seminar, December 24, 2022, University of the Punjab, Lahore, Pakistan
Scholarly Services	○ Reviewer of the Journals (Applied Catalysis A, Chemical Communications, Chemical Engineering Journal, Chemical Engineering Communications, Separation Science and Technology, Chemical Engineering Research and Design, Chemical Product and Process Modeling, Journal of Petroleum Science and Engineering, International Journal of Sustainable Energy) ○ Member organizing committee, The 1st International Conference on Unmanned Vehicle Systems February 5–7, 2019, Muscat, Oman ○ Chair a session at the 10th International Conference on Thermal Engineering: Theory and Applications (ICTEA) February 26–28, 2017, Muscat, Oman ○ Chair a session at the 5th Symposium on Engineering Sciences

		April 03, 2014, Lahore, Pakistan
	○	Member organizing committee, International Conference on Engineering Sciences February 28–29, 2012, Lahore, Pakistan
Courses Developed	○	MSc Chemical Engineering Course for the Institute of Chemical Engineering and Technology, University of the Punjab, Lahore (2012, 2020)
	○	BSc Chemical Engineering with Oil and Gas Refining for the Department of Chemistry and Chemical Technologies, S. Toraighyrov Pavlodar State University, Pavlodar, Kazakhstan (2016)
Other Academic Services	○	Director (Since Feb-2021) Engineering Research Centre, University of the Punjab, Lahore, Pakistan
	○	Post Graduate Coordinator (2021-2022)
	○	Member Board of Studies, Department of Polymer Engineering, University of the Punjab, Lahore (Since 2020)
	○	Member Board of Studies, Institute of Chemical Engineering and Technology, University of the Punjab, Lahore (2013 to 2016, Since 2020)
	○	Member Board of Faculty of Engineering and Technology, now called, Chemical and Materials Engineering (Since 2020)
	○	Member Academic Council, University of the Punjab, Lahore (Since 2018)
	○	Member Senate, University of the Punjab, Lahore (Since 2018)
	○	Bookstore Coordinator, Department of Petroleum and Chemical Engineering, Sultan Qaboos University, Muscat, Oman (2016 to 2019)
	○	Head Continuing Professional Development Center, Institute of Chemical Engineering and Technology, University of the Punjab, Lahore, Pakistan (2012 to 2016)
	○	Member Doctoral Committee, Institute of Chemical Engineering and Technology, University of the Punjab, Lahore (2010 to 2016, since 2020)
Awards and Achievements	○	Best Presentation Award (9th International Conference on Clean and Green Energy, February 10–12, 2020, Barcelona, Spain)
	○	Best Presentation Award (9th International Conference on Environmental Science and Technology, June 20–22, 2018, Prague, Czech Republic)
	○	PhD approved supervisor Higher Education Commission, Pakistan (2011)
	○	Overseas scholarship for PhD studies in advanced countries by Higher Education Commission Pakistan
	○	Gold Medal in BSc Chemical Engineering
Courses Taught		Current Courses
	○	Advanced Process Design and Simulation (MSc Chem Eng, 2021–2023)
	○	Advanced Reactor Design and Catalysis (MSc Chem Eng, 2022–2023)
	○	Chemical Plant Design (BSc Chem Eng, 2020–2023)
	○	Process Design and Optimization (BSc Chem Eng, 2020–2023)
		Previous Courses
	○	Heterogeneous Catalysis (PhD Chem Eng, 2013–2014)
	○	Advanced Thermodynamics and Kinetics (PhD Chem Eng, 2012–2013)
	○	Advanced Computational Mathematics (MSc Chem Eng, 2021)
	○	Advanced Transport Phenomena (MSc Chem Eng, 2021)
	○	Advanced Chemical Reaction Engineering (MSc Chem Eng, 2012–2016)
	○	Advanced Chemical Engineering Thermodynamics (MSc Chem Eng, 2014–2016)
	○	Advanced Process Dynamics and Control (MSc Chem Eng, 2011–2013)
	○	Petroleum and Gas Engineering (MSc Chem Eng, 2013)
	○	Petroleum and Gas Engineering, Lab Course (MSc Chem Eng, 2013)
	○	Heat Transfer (BSc Chem Eng, 2016–2020)
	○	Chemistry for Petroleum Engineering (BSc Pet Eng, 2016–2020)
	○	Process Heat Transfer (BSc Chem Eng, 2017–2020)
	○	Petroleum Refining Processes (BSc Chem Eng, 2020)
	○	Natural Gas Processing (BSc Chem Eng, 2018)
	○	Petroleum Refinery Engineering II (BSc Chem Eng, 2012–2016)
	○	Transport Phenomena (BSc Chem Eng, 2013–2015)
	○	Fundamentals of Heat Transfer (BSc Chem Eng, 2012–2014)

	○	Petroleum Refinery Engineering I (BSc Chem Eng, 2013)
	○	Chemical Engineering Thermodynamics (BSc Chem Eng, 2004–2006)
	○	Chemical Plant Design (BSc Chem Eng, 2003–2006)
	○	Particulate Solids Technology, Lab Course (BSc Chem Eng, 2001–2006)
	○	Particulate Solids Technology (BSc Chem Eng, 2001–2003)
	○	Fluid and Particle Mechanics, Lab Course (BSc Chem Eng, 2003)
	○	Fuel Engineering, Lab Course (BSc Chem Eng, 2002)
	○	Chemical Reaction Engineering (BSc Chem Eng, 2000–2001)
	○	Mass Transfer Operations (BSc Chem Eng, 2000–2001)
	○	Transport Phenomena, Lab Course (BSc Chem Eng, 2000–2001)
Selected Training	○	Summer School on Environmental Sustainability in Petroleum industry Institute of Environmental Engineering (Aug 15–24, 2022) RUDN University, Moscow, Russia
	○	Creating Significant Learning through Integrated Course Design Conducted by Dr. Stewart Ross (September 12, 2018) Sultan Qaboos University, Muscat, Oman
	○	Critical Thinking Skills for the 21st Century Conducted by Prof. Nikos Mourtous (May 16, 2017) Sultan Qaboos University, Muscat, Oman
	○	Creating Significant Learning Experiences: Designing Courses for Significant Learning Conducted by Dr. Stewart Ross (February 13, 2017) Sultan Qaboos University, Muscat, Oman
	○	Indigenous On-campus Training Program for Management Team (November 17–21, 2014) Human Resource Development Center University of the Punjab, Lahore, Pakistan
	○	Safety Leadership Training (July 18–20, 2011) FMC Ungaran Plant, Ungaran, Semarang, Indonesia
	○	Catalysis: Fundamentals and Practice (July 13–17, 2009) University of Liverpool, United Kingdom
	○	Finite Element Modeling and Simulation with Comsol Multiphysics 3.4 (May 21–23, 2008) University of Sheffield, Sheffield, United Kingdom
	○	Workshop on Biochemical Engineering and Fermenters Conducted jointly by Institute of Biochemistry and Biotechnology (August 19, 2006) University of the Punjab, Lahore and Bioengineering, Switzerland
	○	Orientation Program (August 12–23, 2002) Human Resource Development Center University of the Punjab, Lahore
	○	Faculty Development Program Summer 2000 (July 17–22, 2000) Human Resource Development Center University of the Punjab, Lahore
Professional Affiliations	○	Member, Pakistan Institute of Chemical Engineers (PIChE)
	○	Member, Pakistan Engineering Council
	○	Member, National Council for Quality & Technology, Pakistan
References	○	Dr David Cresswell (PhD adviser) Visiting Professor School of Chemical Engineering and Analytical Science The University of Manchester, Manchester, United Kingdom Email: davecresswell24@hotmail.com
	○	Dr Rafiullah Khan (Current employer) Professor and Director Institute of Chemical Engineering and Technology University of the Punjab, Lahore Email: rkhan.icet@pu.edu.pk