Mohd Adnan Khan, PhD

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Summary

- Assistant Professor in the Department of Chemical and Materials Engineering at University of Alberta.
- Principal Investigator of Energy Transition Lab leading the development of advanced materials, technologies, & net-zero energy transition models (based on technoeconomic and lifecycle analysis) in the area of **sustainable hydrogen and chemicals production**.
- Proven experience (10+ yrs) of leading research teams in academia and industry, mentoring students, managing projects, securing research funding (> 1 MM $) & leading international collaborations.
- Author/Co-Author of **46 scientific publications** in reputed journals, **4 industry/government reports**, and **6 granted US patents**.

Research Interests

- Development of photo-/electrocatalysts, reactor systems for renewable hydrogen & chemicals production.
- Development of integrated energy systems models to help build credible transition pathways, and innovative solutions toward net-zero emissions, with a focus on the role of hydrogen.

Professional Experience

1) **Assistant Professor at University of Alberta, Canada** 2022/09 – Present

Key Roles and Responsibilities:
- Mentoring students, postdocs, engineers, and research assistants.
- Teaching and developing new courses on sustainable chemical and materials engineering.
- Writing research proposals, maintaining research lab, managing research grants and budgets.
- Currently leading and managing fully funded projects on:
  - Electrochemical valorization of biomass and methane.
  - Photoelectrochemical hydrogen production under concentrated light.
  - Design and technoeconomic-environmental assessment of new hydrogen value chains for HD transport, steel production and large-scale energy export.
  - Regulatory gap analysis using quantitative risk assessment for hydrogen adoption.

2) **Energy Systems Analyst at The Transition Accelerator, Canada** 2021/05 – 2022/08
Manager: Dr. David Layzell

Key Roles and Responsibilities:
- Lead Energy Analyst for transportation and infrastructure sector in Edmonton Hydrogen Hub.
- Design and analysis (techno-economic and life cycle) of a new H_2 value chain for Alberta's HD transport.
- Project management and coordination with different stakeholders such as Govt. of Alberta, AMTA, Edmonton & Calgary transit, Ballard, National Resources Canada, Suncor, Air Products etc.
- Lead collaborations with industry and academia on various projects such as:
  - Analysis of wind powered on site electrolyzer for heavy-duty fueling station in Southern Alberta
  - Integration of Canadian gas and electrical grids for a net-zero future.

3) **Research Scientist at University of Calgary, Canada** 2020/04 to 2021/04
PI: Prof. Md Golam Kibria and Prof. Jinguang Hu

Key Roles and Responsibilities:
- Development of catalysts, electrodes, reactors for electro-chemical H_2 production, CO_2 reduction, and biomass oxidation.
- System level analysis (techno-economic and life cycle) of pathways for CO_2 conversion and/or biomass upgrade to fuels and chemicals.
- Writing research proposals, mentoring PhD & master's students.

4) **Scientist → Senior Scientist → Lead Scientist** 2014/02 to 2020/03
Saudi Basic Industries Corporation (SABIC) Corporate R&D, KSA
PI: Prof. Hicham Idriss

Key Roles and Responsibilities:
- Project Leader:
  - Development and prototyping of integrated photo-electrochemical systems for hydrogen production under concentrated light using tandem III–V Light absorbers.
  - Development of plasmonic photocatalytic systems for hydrogen production.
- Design, synthesis, testing and integration of PV solar cells, photo-electrocatalysts for hydrogen production using sunlight.
- Business case development, experimentation, economic analysis, writing patents & scientific articles.
- Managed multidisciplinary teams, projects (budgets ~$500K), and global collaborations.
- Helped build world class R&D center by assisting with procurement, hiring, and training.

Research Funding

1) Project title: "Rational Design of Electrocatalysts for Low-Emission Chemical Production: Enabling the Transition to a Clean Future", **Funding Granted**: 175,000 $, Natural Sciences and Engineering Research Council of Canada.
2) Project title: " Building a net-zero transition pathway for Canada's heavy-duty (Class 8) trucks that accounts for provincial differences and addresses key obstacles", **Funding Granted**: 270,000 $, Environment and Climate Change Canada (2023).
3) Project title: "Regulatory and Insurance Gap Analysis for Hydrogen value chain development in Alberta", **Funding Granted**: 112,000 $, Alberta Innovates (2023).
4) Project title: "Developing a net-zero vision and credible transition pathways for Canada's steel sector", **Funding Granted**: 98,000 $, Scotia Bank (2023).
5) Project title: "Assessing the Techno-economic and Environmental Feasibility of Distributed Hydrogen Production Pathways to Decarbonize HD Transport in Alberta", **Funding Granted**: 200,000 $, Hydrogen Centre of Excellence (2022).
6) Project title: " Development of Co-Electrolysis Systems for Low-cost Hydrogen Production", **Funding Granted**: 200,000 $, University of Alberta Internal Dean Grant (2022).
7) Project title: " Self-disinfecting anti-viral coatings", **Funding Granted**: 50,000 $, *PI: Prof. Golam Kibria, Co-PI: Mohd Adnan Khan*, NSERC (2021).

Teaching Experience

1) Full teaching load
   - 2023: Energy and Environment (CHE 494 (undergrad) and CHE 694 (Graduate))
   - 2023: Colloquium: Communication for Engineers (CME 481)

2) Guest Lecturer
   - 2021: Science and Technology of Catalysts (ENCH 619)
     Topic: Invited for guest lectures covering basic principles of electrochemistry.

3) Teaching Assistant
   - 2006: Computer Organization & Assembly Language (COE 205)
     Role: Prepared teaching aids, design project materials and helped with grading assignments, reports, and exams.

Supervision and Mentorship Experience

1) University of Alberta:
   - Post-docs: Dr. Moslem Fattahi and Tejaswini Eagalapati
   - Research Associates: Pooya Talebi, Harpreet Singh and Alireza Lotfollahzade
   - Masters students: Bapti Biswas, Mohammad Arshad, Harveen Kaur and Niyaz Ahmad
   - PhD students: Taha Kubbar
   - COOP students: Sara Tijani and Vimalkirti Waghmare

2) University of Calgary:
   - Masters students: Shariful Kibria Nabil
   - PhD students: Tareq Al-Attas and Muflih Adnan

3) SABIC Corporate R&D:
   - Research Scientists: Dr. Ahmed Ziani and Dr. Ibraheam Al-Shankiti
   - Research Engineers: Maher Al-Oufi and Salem Al-Taweel

Service Experience

1) University of Alberta:
   - MSc/PhD Supervisory Committee: 8
   - Chair of MSc/PhD candidacy exam or defense: 15+
   - Developing new degree option specializing on clean energy in Chemical Engineering.

2) Scientific Community:
   - Editorial Board of Electrochemistry (specialty section of Frontiers in Chemistry)
   - Guest Editor for Special Issue on "Catalysis in Energy Conversion: Hydrogen Production from Water, CO_2 and Biomass Conversion" in Applied Sciences.
   - Active Reviewer for various ACS and RSC journals
   - Organizing Conference Symposia on Advanced Materials for Sustainable Energy and Carbon Management in Canadian Materials Science Conference (CMSC) 2024.

Collaborations Established

1) At University of Alberta:
   - Prof. Husam AlShareef, Professor, Material Science and Engineering, KAUST.
   - Prof. Shahid Rasul, Associate Professor, Mechanical Engineering, Northumbria university.
   - Prof. Golam Kibria, Associate Professor, Chemical Engineering, University of Calgary.

2) At University of Calgary:
   - Prof. Pulickel Ajayan, Professor and Chair, Materials Science and Nano-Engineering, Rice University
   - Prof. Noreddine Ghaffour, Professor, Environmental Science and Engineering, KAUST

3) At SABIC:
    - Prof. Jr Hau-He, Professor, Materials Science & Engineering, KAUST.

Professional Affiliations and Activities

1) Member of Canadian Society for Chemical Engineering (CSChE) (2022-Current)
2) Founding President of MRS (Materials Research Society) KAUST student chapter (2012-2015)
3) Student President of Materials Science and Engineering department, KAUST (2009-2010)
4) Student President of University Basketball Association (UBA), KAUST (2011-2014)
5) Member of the Founding Student Graduate Student Council, KAUST (2009-2010)
6) Founding member of Business and Entrepreneurship Club, KAUST (2009-2010)
7) Member of IEEE (Institute for Electrical and Electronic Engineers (2008-present)
8) Member of Saudi Arabian Chemical Society (2006-2008)

Publications

46 scientific publications, Citations: 2200, h-index: 23

1) J. N. Hausmann, Lea R. Winter; **M. A. Khan**, M. Elimelech; M. Kibria; T. Sontheimer; P. W. Menezes, "Direct Seawater Electrolysis Threatens Electrolyzer Development", **Joule**, *Accepted* (2024) [IF: 38]
2) T. AlAttas, K. Kannimuthu, **M.A. Khan*** and M. Kibria, "Uncovering electrochemical CH_4 oxidation mechanism through in situ detection of reaction intermediates", **ACS Catalysis**, *Accepted* (2024) [IF:12]
3) H. K.Tatla, S. Ismail , **M. A. Khan***, B. R. Dhar, R. Gupta, "Coupling hydrothermal liquefaction and anaerobic digestion for waste biomass valorization: A review in context of circular economy", Chemosphere, https://doi.org/10.1016/j.chemosphere.2024.142419 (2024) [IF: 5.1]
4) S. Nabil^{+}, M. Arshad^{+}, K. Kannimuthu, M. Rashid, H.S. Shiran, M. Kibria and **M. A. Khan***, "Acid Base Chemistry and the Economic Implication of Carboxylate Production", **Nat Catalysis**, https://doi.org/10.1038/s41929-024-01107-6, (2024) [IF: 40.1]
5) A. Joshi, L. Lefsrud*, M. Tufail, **M.A. Khan***, "Mitigating uncertainty: A risk informed approach for deploying hydrogen refueling stations", **International Journal of Hydrogen Energy**, https://doi.org/10.1016/j.ijhydene.2024.06.085, (2024) [IF: 7.1]
6) T.A. Al-Attas^{+}, **M.A. Khan**$^{+}$, T.J. Goncalves, N.G. Yasri, M. Roostaeinia, S. Roy, A.S. Zeraati, P. Kumar, K.A. Miller, P.M. Ajayan, I.D. Gates, J. Hu, V. Thangadurai, S. Siahrostami and M.G. Kibria*, "Bioinspired multi-metal electrocatalyst for selective methane oxidation", **Chemical Engineering Journal,** https://doi.org/10.1016/j.cej.2023.145827, (2023) [IF: 15.1] ($^{+}$Equal contribution)
7) **M.A. Khan**, S. K. Nabil, T. A. Al-Attas, S. Roy, M.M. Rahman, Stephen Larter, P. M. Ajayan, Jinguang Hu* and Md Golam Kibria*, "Zero-crossover electrochemical CO_2 reduction to C_2H_4 with co-production of valuable chemicals", **Chem Catalysis,** https://doi.org/10.1016/j.checat.2022.06.018, (2023) [IF: 10.8]
8) H. Zhao, Q. Jin, **M.A. Khan**, S. Siahrostami, M. G. Kibria and J. Hu*, "Rational design of carbon nitride for remarkable photocatalytic H_2O_2 production", **Chem Catalysis,** https://doi.org/10.1016/j.checat.2022.04.015, (2022) [IF: 10.8]
9) I. Majeed, H. Al, A. Idrees, A. Arif, W. Ashraf, S. Rasul, **M. A. Khan***, and M.A. Nadeem*, "Understanding the role of metal supported on TiO_2 in photoreforming of oxygenates," **Energy Adv**. 1(11), DOI, https://doi.org/10.1039/D2YA00110A, (2022)
10) Hussain, Shoaib, S., Daneshmand, S. V., Zareipour, H., Layzell, D., and **M.A. Khan**, "Optimal Sizing of a Stand-alone Renewable-Powered Hydrogen Fueling Station", **IEEE** International Autumn Meeting on Power, Electronics and Computing (2022).
11) M.A. Nadeem, **M.A. Khan**, A. Ziani and H. Idriss, "An Overview of the Photocatalytic Water Splitting over Suspended Particles", **Catalysts**, https://doi.org/10.3390/catal11010060, (2021) [IF: 4.4]

12) **M.A. Khan**, T. Al-Attas, S. Roy, M.M. Rahman, N. Ghaffour, V. Thangadurai, S. Larter, J. Hu, P. M. Ajayan, and M.G. Kibria*, "Seawater Splitting for Hydrogen Production: A Solution Looking for a Problem?", **Energy Environmental Science,** https://doi.org/10.1039/D1EE00870F, (2021) [IF: 38]

13) M.Wang, I. Mohsin, **M.A. Khan**, J. Wicks, A. H. Ip, K. Z. Sumon, C. T. Dinh, E. H. Sargent*, I. D. Gates, and Md Golam Kibria*, "Can Sustainable Ammonia Synthesis Pathways Compete with Fossil-fuel Based Haber-Bosch Processes?", **Energy Environmental Science,** https://doi.org/10.1039/D0EE03808C, (2021) [IF: 38]

14) M. A. Adnan[+], **M.A. Khan**[+], P. M. Ajayan, M. M. Rahman, Jinguang Hu*, and Md Golam Kibria*, "Transition pathways towards net-zero emissions methanol production", **Green Chemistry,** https://doi.org/10.1039/D1GC01973B, (2021) [IF: 9.4] ([+]Equal contribution)

15) **M.A. Khan***, I. Al-Shankiti, A. Ziani and H. Idriss* et al., "Demonstration of green hydrogen production using solar energy at 28% efficiency and evaluation of its economic viability", **Sustainable Energy & Fuels**, https://doi.org/10.1039/D0SE01761B, (2021) [IF: 5.5]

16) U. Nwosu, A. Wang, B. Palma, H.Zhao, **M.A. Khan**, Md Kibria and Jinguang Hu*, "Selective biomass photo-reforming for valuable chemicals and fuels: a critical review", **Renewable & Sustainable Energy Reviews,** https://doi.org/10.1016/j.rser.2021.111266, (2021) [IF: 12.1]

17) I. Majeed, M. Faizan, **M.A. Khan**, M. Imran, Hassan Ali, M.A. Nadeem*, "CdS nanorods supported copper-nickel hydroxide for hydrogen production under direct sunlight", **Journal of Environmental Chemical Engineering,** https://doi.org/10.1016/j.jece.2021.105670, (2021) [IF: 4.0]

18) M. A. Nadeem, **M. A. Khan**, A. Ziani, and H. Idriss*, "An Overview of the Photocatalytic Water Splitting over suspended Particles", **Catalysts**, https://doi.org/10.3390/catal11010060, (2021) [IF: 3.5]

19) **M.A. Khan**, Tareq A. Al-Attas, Nael G. Yasri, Heng Zhao, Stephen Larter, Jinguang Hu* and Md Golam Kibria*, "Techno-economic analysis of a biomass electrolysis pathway for coproduction of hydrogen and value-added chemicals", **Sustainable Energy & Fuels**, https://doi.org/10.1039/D0SE01149E, (2020) [IF: 5.5]

20) Xinxing Wu, Heng Zhao, **M.A. Khan**, Partha Maity, Tareq Al-Attas, Omar F Mohammed, Md Golam Kibria*, Jinguang Hu*, "Sunlight-Driven Biomass photo-refinery for coproduction of Sustainable Hydrogen and Value-Added Biochemicals", **ACS Sustainable Chemistry and Engineering**, https://doi.org/10.1021/acssuschemeng.0c06282, (2020) [IF 7.0]

21) **M.A. Khan**, I. Al-Shankiti, A. Ziani, N. Wehbe and Hicham Idriss*, "A Stable Integrated Photoelectrochemical Reactor for H_2 Production from Water Attains a Solar-to-Hydrogen Efficiency of 18 % at 15 Suns and 13 % at 207 Suns", **Angewandte Chemie Intl Edition**, https://doi.org/10.1002/anie.202002240, (2020) [IF: 12.9]

22) A. Ziani, I. Al-Shankiti, **M. A. Khan***, and H. Idriss*, "Integrated Photo-Electrocatalytic (PEC) Systems for Water Splitting to Hydrogen and Oxygen under Concentrated Sunlight: Effect of Internal Parameters on Performance", **Energy & Fuels**, https://doi.org/10.1021/acs.energyfuels.0c02481, (2020) [IF: 3.4]

23) **M.A. Khan***, L. Braic, Y. AlSalik and H. Idriss*, "Growth of epitaxial strontium titanate films on germanium using pulsed laser deposition", **Applied surface science**, https://doi.org/10.1016/j.apsusc.2020.148601, (2020) [IF: 6.1]

24) **M.A. Khan**, P. Varadhan, V. Ramalingam, Hui-Chun Fu, H. Idriss* and Jr-Hau He*, "Importance of Oxygen measurements in PEC water splitting reactions", **ACS Energy Letters**, https://doi.org/10.1021/acsenergylett.9b02151, (2019) [IF: 19]

25) Julián A. Moreno, **M.A. Khan***, Giovanni Marinaro, Maher Al-Oufi, Jorge A. Holguín, Boon Ooi, Hicham Idriss, and Jürgen Kosel, "Growth of Ordered Iron Oxide Nanowires for Photoelectrochemical Water Oxidation", **ACS Applied Energy Materials**, https://doi.org/10.1021/acsaem.9b01343, (2019)

26) **M.A. Khan***, P. Maity, M. Al-Oufi, I.K. Al-Howaish, and H. Idriss*, "Electron Transfer of the Metal/Semiconductor System in Photocatalysis", **Journal Physical Chemistry C**, https://doi.org/10.1021/acs.jpcc.8b03741, (2019) [IF: 4.5]

27) M. N. Almadhoun, **M. A. Khan**, K. Rajab, J. Buriak* and H. N. Alshareef*, "UV-induced ferroelectric phase formation in PVDF films", **Advanced Electronic Materials**, https://doi.org/10.1002/aelm.201800363, (2018) [IF: 6.6]

28) T. T. Isimjan*, S. Rasul, **M.A. Khan**, I. K. Alhowaish and T. Ahmed, "Rational Design of Pd-TiO_2/g-C_3N_4 Heterojunction with Enhanced Photocatalytic Activity Through Interfacial Charge Transfer", **Clean Energy**, https://doi.org/10.1093/ce/zky021, (2018)

29) **M.A. Khan**, M. Al-Oufi, A. Toseef, M. A. Nadeem, and H. Idriss*, "Comparing the reaction rates of plasmonic gold and non-plasmonic palladium on photocatalytic hydrogen production", **Catalysis Letters**, https://doi.org/10.1007/s10562-017-2197-z, (2018) [IF: 2.8]

30) **M.A. Khan**, L. Sinatra, M. Al-Oufi, O. M. Bakr and H. Idriss*, "Evidence of Plasmonic Induced Photocatalytic Hydrogen Production on Pd/TiO_2 Upon Deposition on Thin Films of Gold", **Catalysis Letters**, https://doi.org/10.1007/s10562-017-1998-4, (2017) [IF: 2.8]

31) **M.A. Khan** and H. Idriss*, "Advances in plasmon enhanced up-conversion luminescence phenomena and their possible effect on light harvesting", **WIREs Energy and Environment**, https://doi.org/10.1002/wene.254, (2017) [IF: 2.9]

32) **M.A. Khan**, M.A. Nadeem and H.Idriss*, "Ferroelectric polarization effect on surface chemistry and photocatalytic activity", **Surface Science Reports**, https://doi.org/10.1016/j.surfrep.2016.01.001, (2016) [IF: 17.8]

33) **M.A. Khan**, J.A.Caraveo-Frescas and H.N.Alshareef*, "Hybrid Dual Gate p-type Ferroelectric Memory for Multilevel Information Storage", **Organic Electronics**, https://doi.org/10.1016/j.orgel.2014.10.034, (2015) [IF: 3.4]

34) **M.A. Khan**, M. Al-Oufi, A. Tossef, Y. Al-Salik and H. Idriss, "On the role of CoO in CoO_x/TiO_2 for photocatalytic hydrogen production from water in the presence of glycerol", **Catalysis, Structure & Reactivity**, https://doi.org/10.1080/2055074X.2015.1124191, (2015)

35) **M.A. Khan**, U. S. Bhansali, M. N. Almadhoun, I. N. Odeh, Dongkyu Cha, and H.N. Alshareef*, "High-Performance Ferroelectric Memory Based on Phase-Separated Films of Polymer Blends", **Advanced Functional Materials**, https://doi.org/10.1002/adfm.201302056, (2014) [IF: 16.8]

36) J. A. Caraveo-Frescas[+], **M. A. Khan**[+] and H. N. Alshareef*, "Polymer Ferroelectric Field-Effect Memory Device with SnO Channel Exhibits Record Hole Mobility", **Nature Scientific Reports**, https://doi.org/10.1038/srep05243, (2014) [IF: 4.2] ([+]Equal contribution)

37) A. N. Hanna, U. S. Bhansali, **M.A. Khan** and H. N. Alshareef*, "Characterization of current transport in ferroelectric polymer devices", **Organic Electronics**, https://doi.org/10.1016/j.orgel.2013.10.009, (2014) [IF: 3.4]

38) **M.A. Khan**, U. S. Bhansali, Dongkyu Cha, and H. N. Alshareef, "All-polymer bistable resistive memory device based on nanoscale phase-separated PCBM-ferroelectric blends", **Advanced Functional Materials**, https://doi.org/10.1002/adfm.201202724, (2013) [IF: 16.8]

39) S. R. Sarath Kumar, Pradipta K. Nayak, M. N. Hedhili, **M. A. Khan**, and H. N. Alshareef*, "In situ growth of p and n-type graphene thin films & diodes by pulsed laser deposition", **Applied Phys Letters**, https://doi.org/10.1063/1.4829356, (2013) [IF: 3.6]

40) U. S. Bhansali, **M.A. Khan** and H. N. Alshareef*, "Metal-free, single-polymer resistive memory devices on flexible substrates", **ACS Nano**, https://doi.org/10.1021/nn403873c, (2013) [IF: 14.6]

41) U. S. Bhansali, **M.A. Khan** and H. N. Alshareef*, "Organic ferroelectric memory devices with inkjet-printed electrodes on flexible substrates", **Microelectronics Engr**, https://doi.org/10.1016/j.mee.2012.12.024, (2013) [IF: 1.8]

42) **M.A. Khan**, U. S. Bhansali, and H. N. Alshareef*, "High performance non-volatile organic ferroelectric memory on banknotes", **Advanced Materials**, https://doi.org/10.1002/adma.201200626, (2012) [IF: 27.4]

43) U. S. Bhansali, **M.A. Khan** and H. N. Alshareef*, "Electrical performance of polymer ferroelectric capacitors fabricated on plastic substrate using transparent electrodes", **Organic Electronics**, https://doi.org/10.1016/j.orgel.2012.04.026, (2012) [IF: 3.5]

44) **M.A. Khan** U. S. Bhansali, X. X. Zhang, M. M. Saleh, I. Odeh, and H. N. Alshareef*, "Doped polymer electrodes for high performance ferroelectric capacitors on plastic substrates", **Applied Physics Letters**, https://doi.org/10.1063/1.4757426, (2012) [IF: 3.6]

45) **M.A. Khan**, U. S. Bhansali, and H. N. Alshareef*, "Fabrication and Characterization of all-polymer, transparent ferroelectric capacitors on flexible substrates", **Organic Electronics**, https://doi.org/10.1016/j.orgel.2011.08.032, (2011) [IF: 3.5]

46) **M.A. Khan**, M.A. Mukaddam, and U. Schwingenschlögl*, "Buckled graphene: Study based on density functional theory", **Chemical Phys. Letters**, https://doi.org/10.1016/j.cplett.2010.08.059, (2010) [IF: 2.0]

Industry Reports

1) **M.A. Khan**, M. Powell, M. Tampier, E. T. Corthay and Layzell, D. (2023), "Hydrogen and the Decarbonization of Steel Production in Canada" Transition Accelerator Reports Vol. 5, Issue 2, Pg. 1-145. ISSN 2562-6264
2) **M.A. Khan**, MacKinnon C., Young C., and Layzell D. B. (2022), "Techno-economics of a New Hydrogen Value Chain Supporting Heavy Duty Transport", Transition Accelerator Reports: Volume 4, Issue 5, Pg 1-52. ISSN 2562-6264. Version 2.
3) **M.A. Khan**, Young, C., and MacKinnon, C. and Layzell, D. (2021), "The Techno-Economics of Hydrogen Compression", Transition Accelerator Technical Briefs Vol. 1, Issue 1, Pg. 1-36. ISSN 2564-1379
4) **M.A. Khan**, Young, C. and Layzell, D.B. (2021), "The Techno-Economics of Hydrogen Pipelines", Transition Accelerator Technical Briefs Vol. 1, Issue 2, Pg. 1-40. ISSN 2564-1379.

Book Chapters

1) Pawan Kumar, **M.A. Khan**, Jinguang Hu and Md. Golam Kibria, "Single-atom catalysts (SACs) for biomass-derived drop-in chemicals", **Elsevier** (2022)

Patents

1) T.A. Al-Attas**, M.A. Khan**, N. Yasri and, M.G. Kibria, "Electrochemical oxidation of methane to formate", United States Provisional Patent Application No.63/229,188, (2021)
2) **M.A. Khan**, M. Al-Oufi, and H. Idriss, "Z-scheme based nanowire photocatalysts for total water splitting", Patent filed (2020)
3) **M.A. Khan**, I. Al-Shankiti, A. Ziani and H. Idriss*, "Integrated PEC water splitting devices for hydrogen production using concentrated light", Patent filed (2020)
4) **M.A. Khan**, H. N. Alshareef, I.N. Odeh and M. N. Almadhoun, "Ferroelectric capacitor with improved fatigue and breakdown properties", **Granted patent No. US10096352 & EP2973775** (2018)
5) M. N. Almadhoun, **M.A. Khan** and I.N. Odeh, "Processing of thin film organic ferroelectric materials using pulsed electromagnetic radiation", **Granted Patent US10035922B2** (2018)
6) **M.A. Khan**, H. AlGhamdi, U. Ravon, H. Idriss and M. Al-Oufi, "Hydrogen production from hybrid photonic-electronic materials", Application, Publication number WO2017037599 (2017)
7) J. H. Park, H. N. Alshareef, **M.A. Khan** and I. N. Odeh, "Non-volatile ferroelectric memory cells with multilevel operation", Application No: US20170249983A1 (2017)
8) **M.A. Khan**, M. Al-Oufi, and H. Idriss, "Photocatalytic Water Splitting with Cobalt Oxide - Titanium Dioxide – Palladium Nanocomposite", Patent application WO2017098387A1 (2017)
9) J. H. Park, H. N. Alshareef, **M.A. Khan** and I. N. Odeh, "Method for producing a thin film ferroelectric device using two-step temperature process", **Granted Patent No. US9543322 B2** (2017)

10) **M.A. Khan**, U. S. Bhansali, M. N. Almadhoun and H. N. Alshareef, "Resistive Memory device from single polymer material", **Granted Patent EP2907135** (2016)
11) **M.A. Khan**, U. S. Bhansali, M. Saleh and H. N. Alshareef, "Ferroelectric devices, interconnects and methods of manufacture thereof", **Granted Patent No. US 8994014** (2015)
12) **M.A. Khan**, "Doped Graphene Electrodes as interconnects for ferroelectric capacitors", **Granted No: WO2016030755 A1 and EP3129996B1** (2015)
13) T. Emanuele, S. Alessandra, P. Vincenzo, and **M.A. Khan**, "Direct Transfer of Multiple Graphene Layers onto Multiple Target Substrates", Application No. WO2016071780 A1 (2015)

Conferences

1) "Selective Electrooxidation of Methane to Liquid Oxygenates: Insights from Electrochemical and Spectroscopic Studies", Canadian Chemical Engineering Conference, Canada (2023)
2) "Techno-economic Analysis of Large-Scale Hydrogen Export: Enabling Alberta's Leadership in a Net-Zero Future", **Invited Talk**, Canadian Chemical Engineering Conference, Canada (2023)
3) "Regulatory Gap Analysis for Hydrogen value chain development in Alberta", Canadian Chemical Engineering Conference, Canada (2023)
4) "Techno-Economic-Environmental Assessment of Centralized Versus Distributed Hydrogen Production to Support Heavy-Duty Vehicle Fueling in Canada", World Petroleum Congress, Canada (2023)
5) "Transition of Alberta's heavy-duty transport sector to Net-Zero Emissions: Role of Hydrogen", Canadian Chemical Engineering Conference, Canada (2022)
6) "Electrochemical Reduction of CO_2 to Ethylene with Coproduction of Glycolic Acid Via Glycerol Oxidation", Accepted, 239th ECS Meeting, USA (2021)
7) "A Stable Integrated Photoelectrochemical Reactor for Hydrogen Production from Water", **Invited Talk**, 239th ECS Meeting, USA (2021)
8) "Importance of Oxygen measurements in PEC water splitting reactions", MRS Fall Conference, USA (2019)
9) "Surface states of arrays of hematite nanorods for scalable water oxidation", MRS Spring Conference, USA (2018)
10) "Role of plasmonic and non-plasmonic metal nanoparticles for photocatalytic H_2 production", APCAT, India (2017)
11) "Plasmonic to non-plasmonic transition of gold and its effect on the photocatalytic hydrogen production", Chemindix, Bahrain (2016)
12) "Photocatalysis for hydrogen production over metal supported TiO_2", **Invited Talk**, Pacifichem, USA (2015)
13) "Photocatalytic water splitting using CoO_x-TiO_2 nanocomposite photocatalysts", ICAC, KSA (2015)
14) "Hydrogen production from water by thermal and photo-excited methods", European Conference of Surface science (2015)
15) "Graphene Transparent Electrodes for Flexible Electronics", GraphIta, Italy (2014)
16) "Single-polymer, bistable resistive memory devices on flexible substrates", MRS Spring Conference, USA (2013)
17) "High Performance non-volatile organic ferroelectric memory on banknotes", MRS Spring Conference, USA (2012)
18) "Inkjet printing of polymer electrodes for polymer ferroelectric memories on flexible substrates", Flexible Electronics and Display Conference, USA (2012)