Muhammad Tawalbeh

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Personal Information:

- Marital status: married
- Nationality: Canadian and Jordanian
- Languages spoken/written: English and Arabic

Research Interest:

1- Renewable energy
2- Fuel cells
3- Membrane synthesis and separation
4- Adsorption
5- Carbon dioxide capture
6- Modeling and simulation
7- Desalination and wastewater treatment
8- Nano fluids

Academic Qualifications:

Ph.D. - University of Ottawa, Ottawa, Ontario, Canada **2007 – 2013**
Department of Chemical and Biological Engineering
Thesis title: "Silicalite-1 Membranes Synthesis, Characterization, CO_2/N_2 Separation and Modeling"
Courses: Adsorption Separations for Environmental Applications, Advanced Transport Phenomena, Membrane Separation Processes, Adsorption Separation Processes.

M. Sc. - Jordan University of Science and Technology, Jordan **1997 – 2000**
Department of Chemical Engineering
Thesis title: "Production of Activated Carbon from Jojoba Seed Residue by Chemical Activation Using a Static Bed Reactor"
Courses: Mathematical Methods in Chemical Engineering, Advanced Chemical Engineering Thermodynamics, Advanced Transport Phenomena, Advanced Chemical Reaction Engineering, Combustion, Process Analysis and Control, Advanced Mass Transfer, Wastewater Engineering.

B. Sc. - Jordan University of Science and Technology Jordan **1992 – 1997**
Department of Chemical Engineering.
Graduation Project: "Design of Acetic Acid Production Plant"
Elective Courses: Petroleum Refinery Engineering, Experimental design and Data Analysis, Extractive Metallurgy, Properties of Materials and Corrosion

Academic/Teaching Experience:

1. **Jan. 2022 – Present:** Associate professor at the Department of Sustainable and Renewable Energy Engineering at the University of Sharjah, Sharjah, UAE.
2. **Sep. 2015 – Jan. 2022:** Assistance professor at the Department of Sustainable and Renewable Energy Engineering at the University of Sharjah, Sharjah, UAE.

3. **Feb. 2015 – June 2015:** Adjunct professor at the Department of Sustainable and Renewable Energy Engineering at the University of Sharjah, Sharjah, UAE.
4. **Feb. 2014 – June 2014:** Adjunct professor at the Department of Chemical Engineering, Abu Dhabi University, Abu Dhabi, UAE.
5. **Sep. 2007 – May. 2012**: Teaching Assistant at the Department of Chemical and Biological Engineering, University of Ottawa, Canada, for the following courses:

   Chemical Engineering Practice, Adsorption Separations for Environmental Applications, Adsorption Separation Processes, Transport Phenomena, Heat Transfer Operations, Chemical Engineering Laboratory, Phase and Chemical Reaction Equilibria, Introduction to Nuclear Engineering.
6. **Sep. 2002 – Dec. 2004**: Research assistant at the Department of Mining, Metals and Materials Engineering, McGill University, Montreal, QC, Canada.
7. **Oct. 2001 – Aug. 2002**: Visiting scholar at the Department of Chemical Engineering, McGill University, Montreal, QC, Canada.
8. **Sep. 1997 - May 1999**: Teaching Assistant at the Department of Chemical Engineering, Jordan University of Science and Technology, Irbid, Jordan, for the following courses:

   Fluid Mechanics, Materials Science, Applied Mathematics of Chemical Engineers, Petroleum Engineering, Numerical Methods for Chemical Engineers. Chemical Engineering Thermodynamics, Equipment Design, Fluid Mechanics Laboratory, Unit Operations Laboratory, and Materials and Corrosion Laboratory.

Courses Taught:

Thermodynamics, Heat Transfer, Bioenergy, Statics and Dynamics, Introduction to Energy Science and Technology, Introduction to Chemical Engineering, Heat Transfer Lab, Fluid Mechanics Lab, Wind Energy Systems Lab, Senior Design Project I coordination, Senior Design Project II coordination.

Students Supervision:

2 PhD students, 5 master students, and 60 undergraduate senior design projects at the University of Sharjah.

Industrial Experience:

1. May 1999 – Oct. 2001: Operation Engineer, Jordan Petroleum Refinery, Zarqa, Jordan.

2. July 1997 – Apr. 1999, Quality Control Engineer, Al Fawz for Detergents and Disinfectants Industries, Irbid, Jordan

Research Experience:

1- Development of composite membranes for direct hydrocarbon proton exchange membrane fuel cells.

2- Studying the removal of biodegradable polymers and their nanocomposites from wastewater.

3- Investigating the use of combined electrocoagulation processes for enhanced pollutants removal.

4- Examining the treatment of olive mill wastewater treatment using ultrasound, adsorption, and advanced oxidation processes.

5- Inspecting the use of treatment of paper mill sludge and its use for bioethanol production.

6- Studying novel MSF desalination plant driven by parabolic trough collectors and a solar pond.

7- Investigating the use of membrane separation as a pre-treatment process for oily saline water.

8- Development of a novel solar desalination unit using integrated parabolic trough concentrated solar power (CSP) and membrane distillation (MD).

9- Investigation of the efficiency and performance enhancement of solar thermal collectors and solar photovoltaic (PV) systems using nanofluids.

10- Investigation of thermal energy storage using adsorption technologies to utilize the benefits of renewable energy and waste heat recovery.

11- Development of polymer/zeolite nanocomposite Proton-Exchange membranes for fuel cell applications.

12- Investigation and development of new technologies for carbon dioxide capture and utilization.

13- Synthesis, characterization, and utilization of the new zeolite membranes in environmental sustainability applications.

14- Investigation of gas mixtures separation using zeolite membranes.

15- Modeling the pure and gas-mixtures permeation through adsorptive membranes.

16- Investigation of the adsorption of pure gases using volumetric and gravimetric systems.

17- Studying the formation of MgOHCl during the dehydration of magnesium chloride hydrates for the magnesium electrolytic production process for.

18- Studying the thermal properties of electrolytic magnesium production process feed.

19- Studying the kinetics of electrolytic magnesium feed dissolution and reactions.

20- Investigation of the deposition of diamond-like films using Arc Ion Plating (AIP) source.

21- Synthesis and characterization of new activated carbon from Jojoba seed residue using chemical activation.

22- Investigation of the effect of agricultural practices on runoff water quality.

Awards & Distinctions:

1- SDEWES **2025** Conference Best Poster Award.

2- **2022 – 2023** The Sharjah Islamic Bank Award for Excellence in Scientific Research for the year 2022-2023 with a value of 10,000 AED.

3- **2022** Membranes Journal Best Paper Award.

4- **2021 – 2022** The University of Sharjah Annual Faculty Incentive Research Award for the year 2021-2022 with a value of 20,000 AED.

5- **2011 – 2012** Excellence Scholarship from University of Ottawa, Ottawa, Canada, of a value of $13,500 CAN/year.

6- **2011 – 2012** Ontario Graduate Scholarship (OGS) of a value of $ 15,000 CAN.

7- **2007 – 2011** PhD Admission Scholarship from University of Ottawa, Ottawa, Canada, of a value of $18,500 CAN/year.

8- **2002 – 2003** Horace G. Young Scholarship for the year 2002 from Mining, Metals and Materials Engineering Department, McGill University, Montreal, Canada, of a value of $ 2000 CAN.

9- **2001 – 2002** M.W. Welch **International Scholarship** for the year 2002 from the International Union for Vacuum Science, Technology and Applications, of a value of $ 15,000 US.

10- **1997 – 2000** Scholarship for the master's degree from Jordan University of Science and Technology, Jordan.

11- **1992 – 1997** Royal Scholarship for the bachelor's degree from the government of Jordan, Jordan.

Grants:

1- Solar-induced advanced oxidation processes for removal of emerging contaminates (pharmaceuticals, pesticides, and personal care products) during water and wastewater treatment. [Amount Secured: 120,000 AED] Competitive Research Grant 2025, University of Sharjah, United Arab Emirates

2- Composite membranes based on MXene-doped Zirconium phosphate/Lignin and Ionic Liquids for High-Temperature Direct Hydrocarbons PEM Fuel Cells. [Amount Secured: 200,000 AED] Targeted Research Grant 2023, University of Sharjah, United Arab Emirates.

3- Next generation self-humidified MXene/Zirconium phosphate proton exchange membranes for high temperature operation. [Amount Secured: 483,700 AED] Faculty Research Grant 2022, American University of Sharjah, United Arab Emirates.

4- Ionic Liquids/Graphene oxide/Polyethersulfone Composite Membranes for High Temperature Direct hydrocarbon PEM Fuel Cells. [Amount Secured: 120,000 AED] Competitive Research Grant 2022, University of Sharjah, United Arab Emirates.

5- Novel proton conductors based on silicalite-1 zeolites/heteropolyacids for high temperature proton exchange membrane (PEM) fuel cells operating at 200^{o}C. [Amount Secured: 200,000 AED] Targeted Research Grant 2020, University of Sharjah, United Arab Emirates.

6- Development of novel composite membranes to be used in direct hydrocarbon fuel cells. [Amount Secured: 40,000 AED] Seed Research Grant 2017, University of Sharjah, United Arab Emirates.

Publications:

Peer-Reviewed Journal Papers:

1- R. Al Shaikh, A. Al-Othman, P. Nancarrow, **M. Tawalbeh**, A. Shamayleh, A Review of Optimization Techniques for PEM Fuel Cells: Towards Enhanced Performance and Efficiency, Computers & Industrial Engineering 214 (2026) 111889.

2- D. Chandrashekhar, **M. Tawalbeh**, A. Al-Othman, F. Almomani, A Review of Enhanced and Emerging Contaminant Removal by Modified Membranes: Advanced Materials, Mechanisms, and Performance Optimization, Process Safety and Environmental Protection 209 (2026) 108553.

3- R.D. Al Bostami, A. Al Othman, **M. Tawalbeh**, K.N. McPhedran, M.M.A. Shirazi, Spent caustic wastewater treatment with emphasis on resource recovery – a critical review, Chemosphere 395 (2026) 144835.

4- R. Al Shaikh, A. Al-Othman, P. Nancarrow, **M. Tawalbeh**, A. Shamayleh, MXene-based Materials for Proton Exchange Membrane Fuel Cells Applications, Cell Reports Physical Science 7 (1) (2026) 103053.

5- I. Shomope, A. Al-Othman1, **M. Tawalbeh**, H. Alshraideh, Machine Learning-Based Prediction and Optimization of Solid Oxide Electrolysis Cells for Green Hydrogen Production Using RF, FFNN, and PSO Approaches, Energy 342 (2026) 139719.

6- **M. Tawalbeh**, M. Sabri, H. Kazim, A. Al-Othman, H. Alshraideh, F. Almomani, Statistical and Machine Learning Methods for Modeling the Next-Generation PEM Water Electrolysis Systems: Response Surface Methodology and Artificial Neural Networks, Energy Conversion and Management: X 29 (2026) 101450.

7- I. Shomope, A. Al-Othman, **M. Tawalbeh**, H. Alshraideh, A. Alraeesi, Enhanced Hydrogen Production from Methane Pyrolysis Using CatBoost with Reptile Search Algorithm Optimization. Energy Nexus 20 (2025) 100576.

8- S. Alyazouri, **M. Tawalbeh**, Mitigation Techniques of Membranes' Biofouling in Bioelectrocemical Cells (BEC Cells): Recent Advances, membranes 15(11) (2025) 332.

9- M.K.M. Handawy, T.M.M. Abdellatief, X. Duan, **M. Tawalbeh**, T. Salameh, A.-K. Hamid, M. Hussein, H.M. Abdelmotalib, A Hybrid AI-Kinetic Framework for Predicting the Pyrolysis of Food Packaging Plastic Waste: Integrating TGA, Model-Free Kinetics, and Artificial Neural Networks, Applications in Energy and Combustion Science 24 (2025) 100418.

10- W. Nimir, T.M. Ahmed, A. Al-Othman, **M. Tawalbeh**, Sofian Kanan, Alginate-tungsten trioxide-reduced graphene-based membranes for PEM fuel cells operating above the boiling point of water, RSC Advances 15 (2025) 42493-42506.

11- B. Nasser, **M. Tawalbeh**, A. Al-Othman, A.G. Olabi, Advances in Machine Learning for the Prediction of Degradations of Fuel Cell Membranes, Renewable and Sustainable Energy Reviews 226 Part A (2026) 116235.

12- **M. Tawalbeh**, A.A. Ali, T.M. Ahmed, A. Al Othman, Novel Flexible Proton-Conducting Gelatin-Based Membranes for Fuel Cell Applications and Flexible Electronics, Processes 13(9), (2025) 2753; https://doi.org/10.3390/pr13092753.

13- W. Bahutair, R. Darra, A. Al-Othman, **M. Tawalbeh**, K. McPhedran, M.M.A. Shirazi, Purifying the future: Membrane technologies for ultrapure water supply in hydrogen production, Desalination 614 (2025) 1191745.

14- **M. Tawalbeh**, M. Sabri, H. Kazim, A. Al-Othman, F. Almomani, Artificial Intelligence and Material Design in Carbon Capture and Utilization: A Review of Emerging Synergies, Carbon Capture Science & Technology 16 (2025) 100470.

15- A.Al-Bsoul, Z. Al-Qodah, **M. Tawalbeh**, K. Bani-Melhem, K.A. Alrawashdeh, M. Hailat, A.A. Al-Taani, E. Gul. From Waste to Solution: Modeling and Characterization of Grape Seed Bio-Waste for Phosphate Removal from Wastewater, Processes 13(8) (2025) 2464; https://doi.org/10.3390/pr13082464.

16- **M. Tawalbeh**, W. Nimir, A. Al-Othman, A. Ka'ki, Facile nanocellulose-lignin composite membranes for polymer electrolyte membrane fuel cells applications operating above the boiling point of water, International Journal of Hydrogen Energy136 (2025) 938-947.

17- B. Nasser, **M. Tawalbeh**, A. Al-Othman, M. Yusuf, Contributions of Green Energy Materials to Sustainable Development Goals, Renewable and Sustainable Energy Technology 1(1), (2025) 1 (1), 100004. https://doi.org/10.53941/rset.2025.100004.

18- I. Shomope, A.A. Ali, **M. Tawalbeh**, A. Al-Othman, F. Almomani, Exploring machine learning approaches for biohydrogen production through dark fermentation in wastewater, International Journal of Hydrogen Energy 161 (2025) 150646.

19- **M. Tawalbeh**, M. F. Hassan, A. Al-Othman, A. Ka'ki, Facile polymer electrolyte membranes based on deep eutectic solvents and alginates for fuel cell applications, International Journal of Hydrogen Energy 136 (2025) 966-977.

20- B. Aljawrneh, B. Albiss, A. Al-Othman, **M. Tawalbeh**, A. Alshanableh, S. Alrousan, R. Hayajneh, Ultrathin flexible zinc cobalt oxide nanowalls supercapacitors for energy storage applications, Energy Nexus 18 (2025), 100439.

21- **M. Tawalbeh**, A.A. Ali, A. Al-Othman, Flexible collagen-based membranes for PEM fuel cells applications: A characterization study, International Journal of Hydrogen Energy 128 (2025) 186-196.

22- R.D. Al Bostami, A. Al Othman, **M. Tawalbeh**, A.G. Olabi, Advancements in Zinc-Air Battery Technology and Water-Splitting, Energy Nexus 17 (2025) 100387.

23- H. Mortada, H.B. Kerrouchi, A.Al-Othman, **M. Tawalbeh**, A Comprehensive Review of Biomass Pellets and Their Role in Sustainable Energy: Production, Properties, Environment, Economics, and Logistics, Waste and Biomass Valorization 16 (2025) 4507–4539. https://doi.org/10.1007/s12649-024-02873-x.

24- A.H. Alami, **M. Tawalbeh**, S. Alasad, M. Ali, M. Alshamsi, H. Aljaghoub, Cultivation of Nannochloropsis algae for simultaneous biomass applications and carbon dioxide capture, Energy Sources, Part A: Recovery, Utilization, and Environmental Effects 47 (1) (2025) 8471–8482 https://doi.org/10.1080/15567036.2021.1933267.

25- T.M. Ahmed, A. Al Othman, A. Shamayleh, **M. Tawalbeh**, Water management and conductivity studies in novel polymer zirconium based membranes for PEM fuel cells, Case Studies in Chemical and Environmental Engineering 11 (2025) 101081.

26- A. A. Ali, A. Al-Othman, **M. Tawalbeh**, A. Ali, C.A. Quist-Jensen, M.M.A. Shirazi, Membrane Technologies for Sustainable Development Goals: A Critical Review of Bright Horizons, Journal of Environmental Chemical Engineering 13 (2025) 114998.

27- I. Shomope, A. Al-Othman, **M. Tawalbeh**, H. Alshraideh, F. Almomani, Machine learning in PEM water electrolysis: A study of hydrogen production and operating parameters, Computers & Chemical Engineering 194 (2025) 108954.

28- I. Shomope, **M. Tawalbeh**, A. Al-Othman, F. Almomani, Predicting Biohydrogen Production from Dark Fermentation of Organic Waste Biomass Using Multilayer

Perceptron Artificial Neural Networks (MLP–ANN), Computers & Chemical Engineering 192 (2025) 108900.

29- H. Kazim, M. Sabri, A. Al-Othman, **M. Tawalbeh**, Utilizing scrap metals in electrocoagulation: Revolutionizing water treatment with AI applications for enhanced resource recovery, Journal of Resource Recovery 2 (2024) 1024.

30- H. Kazim, M. Sabri, A. Al-Othman, **M. Tawalbeh**, Functionalized conducting polymers in photocatalysis and opportunities for artificial intelligence applications, Nano-Structures & Nano-Objects 40 (2024) 101371.

31- Z. Alinejad, N. Parham, **M. Tawalbeh**, A. Al-Othman, F. Almomani, Progress in green hydrogen production and innovative materials for fuel cells: A pathway towards sustainable energy solutions, International Journal of Hydrogen Energy 140 (2025) 1078-1094.

32- B. Aljawrneh, Y.S. Ocak, B. Albiss, A Dwin, **M. Tawalbeh**, A. Al-Othman, ZrO_2 Nanoparticles for Effective Dye Degradation in Wastewater: Synthesis, Characterization, and Photocatalytic Performance Under Sunlight, Journal of Alloys and Compounds 1008 (2024), 176522.

33- M. Sabri, H. Kazim, **M. Tawalbeh**, A. Al-Othman, F. Almomani, Advancements in Humic Acid Removal: Insights into Adsorption Techniques and Hybrid Solutions, Chemosphere 365 (2024) 143373.

34- W. N. Bahutair1, A Alhajar, A. Al Othman, **M. Tawalbeh**, The role of MXenes and MXene composites in enhancing dye-sensitized solar cells characteristics, Process Safety and Environmental Protection 191 Part A (2024) Pages 490-504.

35- **M. Tawalbeh**, I. Shomope, A. Al-Othman, H. Alshraideh, Prediction of Hydrogen Production in Proton Exchange Membrane Water Electrolysis Via Neural Networks, International Journal of Thermofluids 24 (2024) 100849.

36- **M. Tawalbeh**, A. Ali, B. Aljawrneh, A. Al-Othman, Progress in safe nano-structured electrolytes for sodium ion batteries: A comprehensive review, Nano-Structures & Nano-Objects 39 (2024) 101311.

37- **M. Tawalbeh**, W. Nimir, A. Al-Othman, A. Ka'ki, High proton conduction in zirconium silicate/lignin/ionic liquids based- membranes for high temperature PEM fuel cells, Process Safety and Environmental Protection 190 Part A (2024) 779-791.

38- A. Al-Othman, **M. Tawalbeh**, A. Ka'aki, I. Shomope, M. Faheem, Novel zirconium phosphate/MXene/ionic liquid membranes for PEM fuel cells operating up to 145°C, Process Safety and Environmental Protection 189 (2024) 1368-1378.

39- A.A. Ali, A. Al-Othman, **M. Tawalbeh**, Exploring natural polymers for the development of proton exchange membranes in fuel cells, Process Safety and Environmental Protection 189 (2024) 1379-1401.

40- R. Al Shaikh, A. Al-Othman, **M. Tawalbeh**, A. Shamayleh, P. Nancarrow, Development of MXene incorporated PVDF based membranes for an enhanced performance in higher temperature PEM fuel cells, Process Safety and Environmental Protection 189 (2024) 985-994.

41- W. Nimir, A. Al-Othman, **M. Tawalbeh**, Unveiling Zirconium Phytate-Heteropolyacids-Ionic Liquids Membranes for PEM Fuel Cells Applications up to 150°C, International Journal of Hydrogen Energy 107 (2025) 3-14.

42- **M. Tawalbeh**, I. Shomope, A. Al-Othman, Comprehensive Review on Non-Newtonian Nanofluids, Preparation, Characterization, and Applications, International Journal of Thermofluids 22 (2024) 100705.

43- H.A. Khan, **M. Tawalbeh**, B. Aljawrneh, W. Abuwatfa, A. Al-Othman, H. Sadeghifar, A.G. Olabi, A comprehensive review on supercapacitors: Their promise to flexibility, high temperature, materials, design, and challenges, Energy (2024) 131043.

44- **M. Tawalbeh**, A. Al-Othman, A. Ka'ki, S. Mohamad, M. Faheem, Starch-chitosan-ionic liquids-based composite membranes for high temperature PEM fuel cells applications, International Journal of Hydrogen Energy 67 (2024) 852-862.

45- M.F. Hassan, A. Al-Othman, **M. Tawalbeh**, A. Ka'ki, S. Mohamad, Novel Chitosan-ionic liquid immobilized membranes for PEM fuel cells operating above the boiling point of water, International Journal of Hydrogen Energy 53 (2024) 592-601.

46- N. Abdelwahab, A. Al-Othman, **M. Tawalbeh**, M. El Haj Assad, K. Khanafer, The effect of the membrane thickness on the performance of direct methanol fuel cell: Factorial design, Journal of Porous Media 27 (2) (2024) 21-41. https://doi.org/10.1615/JPorMedia.2023025528.

47- **M. Tawalbeh**, A. Farooq, R. Martis, A. Al-Othman, Optimization techniques for electrochemical devices for hydrogen production and energy storage applications, International Journal of Hydrogen Energy 52 Part C (2024) 1058-1092.

48- R.M.N. Javed, A. Al-Othman, P. Nancarrow, **M. Tawalbeh**, Zirconium silicate-ionic liquid membranes for high-temperature hydrogen PEM fuel cells, International Journal of Hydrogen Energy 52 Part C (2024) 894-908.

49- **M. Tawalbeh**, A. Al-Othman, A. Ka'ki, S. Mohamad, A. Al-Jahran, V. Unnikrishnan, O. Zabihi, Q. Li, K. Shirvanimoghaddam, M. Naebe, High temperature studies of graphene nanoplatelets-MOFs membranes for PEM fuel cells applications, Key Engineering Materials 962 (2023) 93-98.

50- W. Nimir, A. Al-Othman, **M. Tawalbeh**, M.F. Hassan, Zirconium phytate-based proton conductors for high-temperature fuel cell applications, Key Engineering Materials 962 (2023) 99-104.

51- A.H. Alami, M. Ramadan, **M. Tawalbeh**, S. Haredy, S. Al Abdulla, H. Aljaghoub, M. Ayoub, A. Alashkar, M.A.Abdelkareem, A.G. Olabi, A critical insight on nanofluids for heat transfer enhancement, Scientific Reports 13 (2023) 15303.

52- N.M. Al-Ananzeh, K. Bani-Melhem, H.E. Khasawneh, **M. Tawalbeh**, Z. Al-Qodah, A. Al-Bodour, Investigating the potential of using solid waste generated from stone cutting factories for phenol removal from wastewater: A study of adsorption kinetics and isotherms, Results in Engineering 20 (2023) 101404.

53- **M. Tawalbeh**, H. Aljaghoub, M. Qasim, A. Al-Othman, Surface modification techniques of membranes to improve their anti-fouling characteristics: Recent advancements and developments, Frontiers of Chemical Science & Engineering 17 (2023) 1837-1865.

54- K. Bani-melhem, M. Elektorowicz, **M. Tawalbeh**, A. Al Bsoul, A. El Gendy, M. Yusuf, H. Kamyab, Integrating of electrocoagulation process with submerged membrane bioreactor for wastewater treatment under low voltage gradients, Chemosphere 339 (2023) 139693.

55- **M. Tawalbeh**, R.N. Javed, A. Al-Othman, F. Almomani, S. Ajith, Unlocking the potential of CO_2 hydrogenation into valuable products using noble metal catalysts: a comprehensive review, Environmental Technology & Innovation 31 (2023) 103217.

56- **M. Tawalbeh**, R.M.N. Javed, A. Al-Othman, F. Almomani, Salinity gradient solar ponds hybrid systems for power generation and water desalination, Energy Conversion and Management 289 (2023) 117180.

57- S. Ong, A. Al-Othman, **M. Tawalbeh**, Emerging technologies in prognostics for fuel cells including direct hydrocarbon fuel cells, Energy 277 (2023) 127721.

58- **M. Tawalbeh**, S. Mohammed, A. Al-Othman, M. Yusuf, M. Mofijur, H. Kamyab, MXenes and MXene-based materials for removal of pharmaceutical compounds from wastewater: A critical review, Environmental Research 228 (2023) 115919.

59- M. Al Murisi, **M. Tawalbeh**, R. Al-Saadi, Z. Yasin, O. Temsah, A. Al-Othman, M. Rezakazemi, A.G. Olabi, New insights on applications of quantum dots in electrochemical systems, International Journal of Hydrogen 52 Part D (2024) 694-732.

60- H. Kazim, M. Sabri, A. Al-Othman, **M. Tawalbeh**, artificial intelligence application in membrane processes and prediction of fouling for better resource recovery, Journal of Resource Recovery 1 (2023) 1008.

61- **M. Tawalbeh**, H.A. Khan, A. Al-Othman, F. Almomani, S. Ajith, A comprehensive review on the recent advances in materials for thermal energy storage applications, International Journal of Thermofluids 18 (2023) 100326.

62- W. Elmobarak, F. Almomani, **M. Tawalbeh**, A. Al-Othman, R. Martis, K. Rasool, Current State of CO_2 Capture with Ionic Liquids: Development and Progress, Fuel 344 (2023) 128102.

63- **M. Tawalbeh**, L. Qalyoubi, A. Al-Othman, M. Qasim, M. Shirazi, Insights on the development of enhanced antifouling reverse osmosis membranes: Industrial applications and challenges, Desalination 553 (2023) 116460.

64- **M. Tawalbeh**, R.N. Javed, A. Al-Othman, F. Almomani, The novel contribution of non-noble metal catalysts for intensified carbon dioxide hydrogenation: Recent challenges and opportunities, Energy Conversion and Management 279 (2023) 116755.

65- **M. Tawalbeh**, H.A. Khan, A. Al-Othman, Insights on the applications of metal oxide nanosheets in energy storage systems, Journal of Energy Storage 60 (2023) 106656.

66- W. Nimir, A. Al-Othman, **M. Tawalbeh**, A. Al Makky, A. Ali, H. Karimi-Maleh, F. Karimi, C. Karaman, Approaches towards the development of heteropolyacid 1-based high temperature membranes for PEM fuel cells, International Journal of Hydrogen Energy 48 (17) (2023) 6638-6656. https://doi.org/10.1016/j.ijhydene.2021.11.174.

67- **M. Tawalbeh**, H. Aljaghoub, A.H. Alami, A.G Olabi, Selection criteria of cooling technologies for sustainable greenhouses: A comprehensive review, Thermal Science and Engineering Progress 38 (2023) 101666.

68- A. Ali, A. Al-Othman, **M. Tawalbeh**, Grand challenges in fuel cell technology towards resource recovery, Journal of Resource Recovery 1 (2023) 1004.

69- **M. Tawalbeh**, S. Mohammed, A. Alnaqbi, S. Alshehhi, A. Al-Othman, Analysis for hybrid photovoltaic/solar chimney seawater desalination plant: A CFD simulation in Sharjah, United Arab Emirates, Renewable Energy 202 (2023) 667-685.

70- F. Almomani, A. Al-Rababah, **M. Tawalbeh**, A. Al-Othman, A comprehensive review of Hydrogen generation by water splitting using 2D nanomaterials: photo vs electro-catalysis, Fuel 332 Part 1 (2023) 125905.

71- K. Bani-Melhem, M.R. Al-Kilani, **M. Tawalbeh**, Evaluation of scrap metallic waste electrode materials for the application in electrocoagulation treatment of wastewater, Chemosphere 310 (2023) 136668.

72- **M. Tawalbeh**, A. Al-Othman, A. Ka'ki, A. Farooq, M. Alkasrawi, Lignin/zirconium phosphate/ionic liquids-based proton conducting membranes for high-temperature PEM fuel cells applications, Energy 260 (2022) 125237.

73- N. Halalsheh, O. Alshboul, A. Shehadeh, R.E. Al Mamlook, A. Al-Othman, **M. Tawalbeh**, A.S. Almuflih, C. Papelis, Breakthrough curves prediction of selenite adsorption on chemically modified zeolite using boosted decision tree algorithms for water treatment applications, Water 2022, 14(16), 2519; https://doi.org/10.3390/w14162519.

74- **M. Tawalbeh**, S. Alarab, A. Al-Othman, R.M.N. Javed, The operating parameters, structural composition, and fuel sustainability aspects of PEM fuel cells: A mini review, Fuels 2022, 3(3), 449-474. https://doi.org/10.3390/fuels3030028 .

75- R.M.N. Javed, A. Al-Othman, **M. Tawalbeh**, A.G Olabi, Recent developments in graphene and graphene oxide materials for polymer electrolyte membrane fuel cells applications, Renewable and Sustainable Energy Reviews 168 (2022) 112836.

76- **M. Tawalbeh**, S. Murtaza, A. Al-Othman, A.H. Alami, K. Singh, A.G. Olabi, Ammonia: A versatile candidate for the use in energy storage systems, Renewable Energy 194 (2022) 955-977.

77- **M. Tawalbeh**, R.M.N. Javed, A. Al-Othman, F. Almomani, The novel advancements of nanomaterials in biofuel cells with a focus on electrodes' applications, Fuel 322 (2022) 124237.

78- A. Alashkar, A. Al-Othman, **M. Tawalbeh**, M. Qasim, A critical review on the use of ionic liquids in proton exchange membrane fuel cells, Membranes 2022, 12(2), 178; https://doi.org/10.3390/membranes12020178.

79- A. Al-Othman, **M. Tawalbeh**, R. Martis, S. Dhou, M. Orhan, M. Qasim, A.G. Olabi, Artificial intelligence and numerical models in hybrid renewable energy systems with fuel cells: Advances and prospects, Energy Conversion and Management 253 (2022) 115154.

80- M. Alkasrawi, E. Abdelsalam, H. Nawafah, F. Almomani, **M. Tawalbeh**, A. Mousa, Integration of solar chimney power plant (SCPP) with PV for co-cooling, power production and water desalination, processes, 9 (12) (2022) 2155. https://doi.org/10.3390/pr9122155.

81- E. Abdelsalam, F. Almomani, F. Kafiah, E. Almaitta, **M. Tawalbeh**, A. Khasawneh, D. Habash, A. Omar, M. Alkasrawi, A new sustainable and novel hybrid solar chimney power plant design for power generation and seawater desalination, Sustainability 2021, 13(21), 12100; https://doi.org/10.3390/su132112100.

82- W.H. Abuwatfa, D. Al-Muqbel, A. Al-Othman, N. Halalsheh, **M. Tawalbeh**, Insights into the removal of microplastics from water using biochar in the era of COVID-19: A mini review, Case Studies in Chemical and Environmental Engineering 4 (2021) 100151.

83- E. Abdelsalam, F. Kafiah, F. Almomani, **M. Tawalbeh**, S. Kiswani, A. Khasawneh, D. Ibrahim, M. Alkasrawi, An innovative design of a solar double-chimney power plant for electricity generation, Energies 14(19) (2021) 6235. https://doi.org/10.3390/en14196235.

84- **M. Tawalbeh**, A. Al-Othman, T. Salamah, M. Alkasrawi, R. Martis, Z. AbuAlrub, A critical review on metal-based catalysts used in the pyrolysis of lignocellulosic biomass materials, Journal of Environmental Management 299 (2021) 113597.

85- M. Al Sharabati, R. Abokwiek, A. Al-Othman, **M. Tawalbeh**, C. Karaman, Y. Orooji, F. Karimi, Biodegradable polymers and their nano-composites for the removal of endocrine-disrupting chemicals (EDCs) from wastewater: A review, Environmental Research 202 (2021) 111694.

86- A. Ka'ki, A.Y. Alraeesi, A. Al-Othman, **M. Tawalbeh**, Proton conduction of novel calcium phosphate nanocomposite membranes for high temperature PEM fuel cells applications, International Journal of Hydrogen Energy 46 (59) (2021) 30641-30657.

87- E. Abdelsalam, F. Kafiah, **M. Tawalbeh**, F. Almomani, A. Azzam, I. Alzoubi, M. Alkasrawi, Performance analysis of hybrid solar chimney power plant (HSCPP) for power production and seawater desalination: A sustainable approach, International Journal of Energy Research 45 (12) (2021) 17327-17341.

88- N.S. Jalbani, A.R. Solangi, S. Memon, R. Junejo, A.A. Bhatti, M. L. Yola, **M. Tawalbeh**, H. Karimi-Maleh, Synthesis of new functionalized Calix[4]arene modified silica resin for the adsorption of metal ions: Equilibrium, Thermodynamic and kinetic modeling studies, Journal of Molecular Liquids 339 (2021) 116741.

89- R. Dhaouadi, A. Al-Othman, A.A. Aidan, **M. Tawalbeh**, R. Zannerni, A characterization study for the properties of dust particles collected on photovoltaic (PV) panels in Sharjah, United Arab Emirates, Renewable Energy 171 (2021) 133-140.

90- M. Alkasrawi, A. Al-Othman, **M. Tawalbeh**, S. Doncan, R. Gurram, E. Singsaas, F. Almomani, S. Al-Asheh, A novel technique of paper mill sludge conversion to bioethanol toward sustainable energy production: Effect of fiber recovery on the saccharification hydrolysis and fermentation, Energy 223 (2021) 120018.

91- O. Mohamed, A. Al-Othman, H. Al-Nashash, **M. Tawalbeh**, F. Almomani, M. Rezakazemi, Fabrication of titanium dioxide nanomaterial for implantable highly flexible composite bioelectrode for biosensing applications, Chemosphere 273 (2021) 129680.

92- R. Martis, A. Al-Othman, M. Alkasrawi, **M. Tawalbeh**, Fuel cells for carbon capture and power generation: Simulation studies, International Journal of Hydrogen Energy 46 (2021) 6139-6149.

93- **M. Tawalbeh**, A. Al-Othman, F. Kafiah, E. Abdelsalam, F. Almomani, M. Alkasrawi, Environmental impacts of solar photovoltaic systems: A critical review of recent progress and future outlook, Science of the Total Environment 759 (2021) 143528.

94- **M. Tawalbeh**, A. Al-Othman, N. Abdelwahab, A.H. Alami, A.G. Olabi, Recent developments in pressure retarded osmosis for desalination and power generation, Renewable and Sustainable Energy Reviews 138 (2021) 110492.

95- A. Al Bsoul, M. Hailat, A. Abdelhay, **M. Tawalbeh**, A. Al-Othman, I.N. Al-kharabsheh, A.A. Al-Taani, Efficient removal of phenol compounds from water environment using Ziziphus leaves adsorbent, Science of the Total Environment 761 (2021) 143229.

96- A. Al-Othman, P. Nancarrow, **M. Tawalbeh**, A. Ka'ki, K. El-Ahwal, B. El Taher, M. Alkasrawi, Novel composite membrane based on zirconium phosphate-ionic liquids for high temperature PEM fuel cells, International Journal of Hydrogen Energy 46 (2021) 6100-6109.

97- **M. Tawalbeh**, A.S. Rajangam, T. Salameh, A. Al-Othman, M. Alkasrawi, Characterization of paper mill sludge as a renewable feedstock for sustainable hydrogen and biofuel production, International Journal of Hydrogen Energy 46 (2021) 4761-4775.

98- H. Mohammed, A. Al-Othman, P. Nancarrow, Y. Elsayed, **M. Tawalbeh**, Enhanced proton conduction in zirconium phosphate/ionic liquids materials for high-temperature fuel cells, International Journal of Hydrogen Energy 46 (2021) 4857-4869.

99- T. Salameh, **M. Tawalbeh**, A. Juaidi, R. Abdallah, A.-K. Hamid, A novel three-dimensional numerical model for PV/T water system in hot climate region, Renewable Energy 164 (2021) 1320-1333.

100- **M. Tawalbeh**, M. Al-Ismaily, B. Kruczek, F.H. Tezel, Modeling the separation of CO_2 through highly permeable tubular silicalite-1 membrane using Maxwell−Stefan equations, Chemosphere 263 (2021) 127935.

101- R. Martis, A. Al-Othman, **M. Tawalbeh**, M. Alkasrawi, Energy and economic analysis of date palm biomass feedstock for biofuel production in UAE: Pyrolysis, gasification and fermentation, Energies 13 (22) (2020) 5877; DOI: 10.3390/en13225877.

102- M. Alkasrawi, A.S. Rajangam, **M. Tawalbeh**, F. Kafiah, A. Al-Othman, T. Kurniawan, Q. Sun, Techno-economic analysis and a novel assessment technique of paper mill sludge conversion to bioethanol toward sustainable energy production, International Journal of Energy Research 44 (15) (2020) 12602-12613. DOI: 10.1002/er.5667.

103- A. Eisa, A. Al-Othman, M. Al-Sayah, **M. Tawalbeh**, Novel composite membranes based on polyaniline/ionic liquids for PEM fuel cells applications, Key Engineering Materials 865 (2020) 55-60.

104- **M. Tawalbeh**, Kinetics study of the digestion of magnesium chloride dihydrate in a molten salt electrolyte, Key Engineering Materials 865 (2020) 105-110.

105- **M. Tawalbeh**, A. Al-Othman, K. Singh, I. Doub, D. Kabakebji, M. Alkasrawi, Microbial desalination cells for water purification and power generation: A critical review, Energy 209 (2020) 118493.

106- Z. Al-Qodah, **M. Tawalbeh**, M. Al-Shannag, Z. Al-Anber, K. Bani-Melhem, Combined electrocoagulation processes as a novel approach for enhanced pollutants removal: A state-of-the-art review, Science of the Total Environment 744 (2020) 140806.

107- **M. Tawalbeh**, T. Salameh, M. Albawab, A. Al-Othman, M. El Haj Assad, A.H. Alami, Parametric study of a single effect lithium bromide-water absorption chiller powered by a geothermal heat source, Journal of Sustainable Development of Energy, Water and Environment Systems 8 (3) (2020) 464-475.

108- A.H. Alami, M. Faraj, K. Aokal, A.A. Hawili, **M. Tawalbeh**, D. Zhang, Investigating various permutations of copper iodide/FeCu tandem materials as electrodes for dye-

sensitized solar cells with a natural dye, Nanomaterials 10 (4) (2020) 784; DOI: 10.3390/nano10040784.

109- A.H. Alami, A.A. Hawili, K. Aokal, M. Faraj, **M. Tawalbeh**, Enhanced heat transfer in agitated vessels by alternating magnetic field stirring of aqueous Fe-Cu nanofluid, Case Studies in Thermal Engineering 20 (2020) 100640.

110- F. Almomani, R. Bhosale, M. Khraisheh, A. Kumar, **M. Tawalbeh**, Electrochemical oxidation of ammonia on nickel oxide nanoparticles, International Journal of Hydrogen Energy, 45 (2020) 10398-10408.

111- T. Salameh, M. El Haj Assad**, M. Tawalbeh**, C. Ghenai, A. Merabet, H.F. Öztop, Analysis of cooling load on commercial building in UAE climate using building integrated photovoltaic façade system, Solar Energy 199 (2020) 617-629.

112- A.H. Alami, A. Abu Hawili, **M. Tawalbeh**, R. Hasan, L. Al Mahmoud, S. Chibib, A. Mahmood, K. Aokal, P. Rattanapany, Materials and logistics for carbon dioxide capture, storage and utilization, Science of the Total Environment 717 (2020) 137221.

113- T. Salameh, **M. Tawalbeh**, M. Al-Shannag, M. Saidan, K. Bani Melhem, M. Alkasrawi, Energy saving in the process of bioethanol production from renewable paper mill sludge, Energy 196 (2020) 117085.

114- A. Al-Bsoul, M. Al-Shannag, **M. Tawalbeh**, A.A. Al-Taani, W.K. Lafi, A. Al-Othman, M. Alsheyab, Optimal conditions for olive mill wastewater treatment using ultrasound and advanced oxidation processes, Science of the Total Environment 700 (2020) 134576.

115- A. Ashkanani, F. Almomani, M. Khraisheh, R. Bhosale, **M. Tawalbeh**, K. AlJaml, Bio-carrier and operating temperature effect on ammonia removal from secondary wastewater effluents using moving bed biofilm, Science of the Total Environment 693 (2019) 133425.

116- A. Al Bsoul, M. Hailat, A. Abdelhay, **M. Tawalbeh**, I. Jum'h, K. Bani-Melhem, Treatment of olive mill effluent by adsorption on titanium oxide nanoparticles, Science of the Total Environment 688 (2019) 1327–1334.

117- **M. Tawalbeh**, F.H. Tezel, M. Al-Ismaily, B. Kruczek, Highly permeable tubular silicalite-1 membranes for CO_2 capture, Science of the Total Environment 676 (2019) 305–320.

118- F. Almomani, R. Bhosale, M. Khraisheh, A. Kumar, **M. Tawalbeh**, Photocatalytic conversion of CO_2 and H_2O to useful fuels by nanostructured composite catalysis, Applied Surface Science 483 (2019) 363–372.

119- E. Bani-Hani, M. El Haj Assad, **M. Tawalbeh**, B. Yousef, A. Sedaghat, Enhancing cooling system of a combustion engine by integrating with a Stirling cycle, Energy Engineering 116 (2019) 41-53.

120- H. Mohammed, A. Al-Othman, P. Nancarrow, **M. Tawalbeh**, M. El Haj Assad, Direct hydrocarbon fuel cells: A promising technology for improving energy efficiency, Energy 172 (2019) 207-219.

121- A. Al-Othman, N.N. Darwish, M. Qasim, **M. Tawalbeh**, N.A. Darwish, N. Hilal, Nuclear desalination: A state-of-the-art review, Desalination 457 (2019) 39-61.

122- F. Almomani, A. Al Ketife, S. Judd, M. Shurair, R. Bhosale, H. Znad, **M. Tawalbeh**, Impact of CO_2 concentration and ambient conditions on microalgal growth and nutrient

removal from wastewater by a photobioreactor, Science of the Total Environment 662 (2019) 662–671.

123- E. Bani-Hani, **M. Tawalbeh**, A. Al-Othman, M. El Haj Assad, Rheological study on seawater contaminated with oil components, Polish Journal of Environmental Studies 28 (2019) 1-7.

124- A. Hai Alami, K. Aokal, D. Zhang, **M. Tawalbeh**, A. Alhammadi, A. Taieb, Assessment of Calotropis natural dye extracts on the efficiency of dye-sensitized solar cells, Agronomy Research 16 (2018) 1569–1579.

125- **M. Tawalbeh**, A. Al Mojjly, A. Al-Othman, N. Hilal, Membrane separation as a pre-treatment process for oily saline water, Desalination 447 (2018) 182–202.

126- A. Al-Othman, **M. Tawalbeh**, M. El Haj Asaad, T. Alkayyali, A. Eisa, Novel multi-stage flash (MSF) desalination plant driven by parabolic trough collectors and a solar pond: A simulation study in UAE, Desalination 443 (2018) 237–244.

127- M. El Haj Assad, E.H. Bani-Hani, B. Yousef, A. Seagate, **M. Tawalbeh**, Simplified model for thermo- and diffusiophoretic deposition in a heat exchanger, JP Journal of Heat and Mass Transfer 15 (2017) 1–13.

128- M. Albuzaudi, T. Eerikäinen, O. Turunen, M. Ghelawi, M. El Haj Assad, **M. Tawalbeh**, S. Shamekh, Effect of gamma irradiation and heat treatment on the artificial contamination of maize grains by Aspergillus flavus Link NRRL 5906, Journal of Stored Products Research 71 (2017) 57–63.

129- A. Al-Othman, Y. Zhu, **M. Tawalbeh**, A.Y. Tremblay, M. Ternan, Proton conductivity and morphology of new composite membranes based on zirconium phosphates, phosphotungstic acid, and silicic acid for direct hydrocarbon fuel cells applications, Journal of porous materials 24 (2017) 721–729.

130- **M. Tawalbeh,** F.H. Tezel, B. Kruczek, S. Letaief, C. Detellier, Synthesis and characterization of silicalite-1 membrane prepared on a novel support by pore plugging method, Journal of Porous Materials 20 (2013) 1047–1421.

131- **M. Tawalbeh,** B. Kruczek, F.H. Tezel, S. Letaief, C. Detellier, Separation of CO_2 and N_2 gases using a novel zeolite membrane, Separation Science and Technology 47 (2012) 1606–1616.

132- **M. Tawalbeh**, M. Allawzi, M. Kandah, Production of activated carbon from Jojoba seed residue by chemical activation using a static bed reactor, Journal of Applied Sciences 5 (2005) 482–487.

International Conference Papers:

1- S. Alzaabi, **M. Tawalbeh**, I. Shomope, A. Al-Othman, Application of Machine Learning Techniques to Predict the Higher Heating Value of Date Palm Waste as Biofuels, 2025 International Conference on Bioengineering Engineering - 2025 Advances in Science and Engineering Technology (ASET) International Conferences.

2- R. Alshaikh, A. Al-Othman, P. Nancarrow, **M. Tawalbeh**, A. Shamayleh, Polyaniline-MXene-PVDF Membranes for Biofuel cells Applications, 2025 International Conference on Bioengineering Engineering - 2025 Advances in Science and Engineering Technology (ASET) International Conferences.

3- A. Amir, **M. Tawalbeh**, Investigating AI and Infrastructure for Efficient Food Waste Management, 2nd International Innovation X.0 Forum (IIF-2025), University of Sharjah, Sharjah, United Arab Emirates, 2025.

4- I. Fatima, A. Al-Othman, **M. Tawalbeh**, Carbon Nanotubes-Based Membranes for High Temperature PEM Fuel Cells, 2nd International Innovation X.0 Forum (IIF-2025), University of Sharjah, Sharjah, United Arab Emirates, 2025.

5- A. Abdelbar, F. AlMomani, **M. Tawalbeh**, A. Al-Othman, "Bioconversion of Carbon Dioxide to Value-Added Products Using Saccharomyces Cerevisiae," 2024 Advances in Science and Engineering Technology International Conferences (ASET), Abu Dhabi, United Arab Emirates, 2024, pp. 1-5, doi: 10.1109/ASET60340.2024.10708728.

6- T. Al-Otaibi, F. AlMomani, Z. Elkahlout, M. Baabbad, **M. Tawalbeh**, A. Al-Othman, "Biochar Characteristics and Pyrolysis Pretreatment Performance," 2024 Advances in Science and Engineering Technology International Conferences (ASET), Abu Dhabi, United Arab Emirates, 2024, pp. 1-5, doi: 10.1109/ASET60340.2024.10708682.

7- **M. Tawalbeh**, M. F. Hassan, A. Al–Othman, A. Ka'ki, F. Almomani, "Alginate Modified Biomaterial Membranes for Fuel Cells Applications," 2024 Advances in Science and Engineering Technology International Conferences (ASET), Abu Dhabi, United Arab Emirates, 2024, pp. 1-4, doi: 10.1109/ASET60340.2024.10708737.

8- A. A. Ali, A. Al-Othman, **M. Tawalbeh**, F. Almomani, "Collagen Based Biomaterials as Membranes for PEM Fuel Cells Applications," 2024 Advances in Science and Engineering Technology International Conferences (ASET), Abu Dhabi, United Arab Emirates, 2024, pp. 1-4, doi: 10.1109/ASET60340.2024.10708699.

9- **M. Tawalbeh**, A. Al-Othman, M.F. Hassan, A. Ka'ki, S. Mohamad, F. Almomani, Novel chitosan-based composite membranes for fuel cells applications, 2023 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates, 2023, pp. 1-4, https://doi.org/10.1109/ASET56582.2023.10180644.

10- N. Yusuf, F. Almomani, **M. Tawalbeh**, A. Al-Othman, Purifying of biogas produced from anaerobic digestions processes: an economical assessment, 2023 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates, 2023, pp. 1-4, https://doi.org/10.1109/ASET56582.2023.10180765.

11- H. Mkacher, F. Almomani, **M. Tawalbeh**, A. Al-Othman, Economic analysis of upfront nitrogen removal from LNG plant, 2023 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates, 2023, pp. 01-06, https://doi.org/10.1109/ASET56582.2023.10180743.

12- A. Al-Othman, **M. Tawalbeh**, A. Ka'ki, S. Mohamad, M.F. Hassan, F. Almomani, Strach/Chitosan membranes for PEM fuel cells applications, 2023 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates, 2023, pp. 1-4, https://doi.org/10.1109/ASET56582.2023.10180456.

13- A. Al-Othman, **M. Tawalbeh**, O. El-Kadri, S. Mohamad, A. Ka'ki, F. Almomani, Proton conductivity studies on covalent organic frameworks (COFs) for the application of high-temperature fuel cells, 2023 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates, 2023, pp. 1-5, https://doi.org/10.1109/ASET56582.2023.10180455.

14- **M. Tawalbeh**, S.T. Abuna'ous, A.A. Chehade, A.F. Chahade, Design and performance analysis of a phase change material thermal battery, 2023 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates, 2023, pp. 1-5, https://doi.org/10.1109/ASET56582.2023.10180480.

15- **M. Tawalbeh**, A. Al-Othman, A. Ka'ki, A. Farooq and M. Alkasrawi, "Highly proton conductive membranes based on lignin/ZrP/PTFE composite for high temperature PEM fuel cells," 2022 Advances in Science and Engineering Technology International Conferences (ASET), 2022, pp. 1-5, doi: 10.1109/ASET53988.2022.9734834.

16- **M. Tawalbeh**, S. M. Shafie, S. F. Alshehhi, A. A. Alnaqbi and A. Al-Othman, "A hybrid photovoltaic/solar chimney seawater desalination plant," 2022 Advances in Science and Engineering Technology International Conferences (ASET), 2022, pp. 1-7, doi: 10.1109/ASET53988.2022.9735006.

17- **M. Tawalbeh**, A. Al Shibli, S. Ahli and F. Alawadhi, "Life cycle analysis for solar powered portable car shade," 2022 Advances in Science and Engineering Technology International Conferences (ASET), 2022, pp. 1-7, doi: 10.1109/ASET53988.2022.9734805.

18- A. Al-Othman, M. F. Hassan, **M. Tawalbeh** and A. Ka'ki, "Proton Conductivity Studies in Zirconium Phosphate/MXenes in PEM Fuel Cells," 2022 Advances in Science and Engineering Technology International Conferences (ASET), 2022, pp. 1-5, doi: 10.1109/ASET53988.2022.9735033.

19- H. Aljaghoub, A. Alashkar, A. H. Alami and **M. Tawalbeh**, "Prediction of Weather Patterns Using Linear Angstrom Model," 2022 Advances in Science and Engineering Technology International Conferences (ASET), 2022, pp. 1-3, doi: 10.1109/ASET53988.2022.9734942.

20- A. Al-Othman, H. Al-Nashash, **M. Tawalbeh**, Y. Elhariri, A. H. Alami and T. Salameh, "Bio-electrodes Based on Poly(methy1 methacrylate) (PMMA) for Neural Sensing," 2020 IEEE 20th International Conference on Nanotechnology (IEEE-NANO), Montreal, QC, Canada, 2020, pp. 253-256, DOI: 10.1109/NANO47656.2020.9183632.

21- T. Salameh, **M. Tawalbeh**, A. Juaidi, R. Abdallah, S. Issa, A. H. Alami, "A novel numerical simulation model for the PVT water system in the GCC region," 2020 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates (2020) 1-5. DOI: 10.1109/ASET48392.2020.9118264.

22- T. Salameh, **M. Tawalbeh**, A. H. Alami, A. Al-Othman, S. Issa, M. Alkasrawi, "Life cycle analysis comparison between single crystalline solar cells and poly crystalline Gallium in UAE," 2020 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates (2020) 1-6. DOI: 10.1109/ASET48392.2020.9118328.

23- T. Salameh, A. Al-Othman, A.G. Olabi, S. Issa, **M. Tawalbeh**, A.H. Alami, "Comparative life cycle assessment for PEMFC stack including fuel storage materials in UAE," 2020 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates (2020) 1-5. DOI: 10.1109/ASET48392.2020.9118189.

24- A. H. Alami, N. Alblooki, **M. Tawalbeh**, Z. Almerashi, A. Alkharousi, T. Salameh, "Compressed air for light vehicle propulsion," 2020 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates, 2020, pp. 1-6, DOI: 10.1109/ASET48392.2020.9118278.

25- A.H. Alami, K. Aokal, **M. Tawalbeh**, M. Faraj, A. Majeed, T. Salameh, D. Zhang, A. Al-Othman, "Synthesis and characterization of polycrystalline copper iodide (CuI) thin films," 2020 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates (2020) 1-5. DOI: 10.1109/ASET48392.2020.9118282.

26- A. Al-Othman, P. Nancarrow, **M. Tawalbeh**, A. Kaki, K. El-Ahwal, B. El Taher, Zirconium phosphate-ionic liquid composite membranes for PEM fuel cells operating at 200ºC, 8th Global Conference on Global Warming (GCGW-2019) April 22-25, 2019, Doha, Qatar, 332 – 334.

27- T. Salameh, **M. Tawalbeh**, M. Albawab, A.H. Alami, A. Al-Othman, M. El Haj Assad, Simulation of a residential space cooling system by geothermal energy in the UAE, The International Conference on Energy, Water & Environmental Sciences (ICEWES 2018) Ras Al Khaimah-UAE, November (2018) 13-15.

28- M. El Haj Assad, **M. Tawalbeh**, T. Salameh, A. Al-Othman, Thermodynamic analysis of lithium bromide absorption chiller driven by geothermal energy, 5th International Conference on Renewable Energy: Generation and Applications, (ICREGA'18), United Arab Emirates (2018) 76-81. (Published in IEEE Xplore DOI: 10.1109/ICREGA.2018.8337607).

29- A.H. Alami, **M. Tawalbeh**, D. Zhang, C. Aokal, L. Elsherbiny, Z. Yasser, A. Abdelghani, Linear Angstrom model applied to weather data collected for the city of Sharjah, 5th International Conference on Renewable Energy: Generation and Applications (ICREGA'18), United Arab Emirates (2018) 150-153. (Published in IEEE Xplore DOI: 10.1109/ICREGA.2018.8337583).

30- D. Zhang, A.H. Alami, **M. Tawalbeh**, C. Aokal, A. Alhammadi, A. Taieb, R. Abu Rabah, Efficiency and high-temperature response of dyesensitized solar cells using natural dyes extracted from Calotropis, 5th International Conference on Renewable Energy: Generation and Applications (ICREGA'18), United Arab Emirates (2018) 183-187. (Published in IEEE Xplore DOI: 10.1109/ICREGA.2018.8337593).

31- **M. Tawalbeh**, A. Al-Othman, M. El Haj Assad, Graphene oxide - Nafion composite membrane for effective methanol crossover reduction in passive direct methanol fuel cells. 5th International Conference on Renewable Energy Generation and Applications, (ICREGA'18), United Arab Emirates (2018) 192-196. (Published in IEEE Xplore DOI: 10.1109/ICREGA.2018.8337596).

32- T. Salameh, **M. Tawalbeh**, M. El Haj Assad, Experimental and numerical studies of heat transfer using three different types of nanofluid in concentric tube heat exchanger, 5th International Conference on Renewable Energy: Generation and Applications (ICREGA'18), United Arab Emirates (2018) 232-237. (Published in IEEE Xplore DOI: 10.1109/ICREGA.2018.8337627).

33- A.A. Hachicha, **M. Tawalbeh**, Design of a new concentrated photovoltaic system under UAE conditions, American Institute of Physics (AIP) Conf. Proc. 1850 (2017) 110004-1–110004-9; DOI: 10.1063/1.4984478.

34- **M. Tawalbeh**, and Harris, R., Thermal properties of electrolytic magnesium production feed, Magnesium Technology 2005, Edited by N.R. Neelameggham, H.I. Kaplan, and B.R. Powell, Feb. 17-23, TMS, Warrendale PA (2005) 33 – 37.

35- **M. Tawalbeh**, Ng, K.W., and Harris, R., Formation of MgOHCl during dehydration of magnesium chloride hydrates by contacting with molten salt, Light Metals 2004, Edited by D. Gallienne and R. Ghomashchi, METSOC (CIM) (2004) 417 – 430.

Book Chapters:

1- M. Sabri, S.M. Asaad, **M. Tawalbeh**, A. Al-Othman, Introduction to fuel cells, Chapter 1, Renewable Energy - Volume 3: Energy Storage Systems - Fuel Cells, Supercapacitors, and Batteries, 1st Edition, ISBN: 978-0-443-29875-2, (2026) 3-36. https://doi.org/10.1016/B978-0-443-29875-2.00011-5.

2- **M. Tawalbeh**, W. Nimir, A, Al-Othman, Developments of fuel cells, Chapter 2, Renewable Energy - Volume 3: Energy Storage Systems - Fuel Cells, Supercapacitors, and Batteries, 1st Edition, ISBN: 978-0-443-29875-2, (2026) 37-62. https://doi.org/10.1016/B978-0-443-29875-2.00019-X.

3- Bana Al Kurdi, Maitha Alzaabi, Maria Almarzooqi, Yasamin Esmaeili, Amani Al-Othman, Ahmad Ka'ki, Moin Sabri, **M. Tawalbeh**, Application of fuel cells, Chapter 3, Renewable Energy - Volume 3: Energy Storage Systems - Fuel Cells, Supercapacitors, and Batteries, 1st Edition, ISBN: 978-0-443-29875-2, (2026) 63-85. https://doi.org/10.1016/B978-0-443-29875-2.00003-6.

4- A. Ka'ki, **M. Tawalbeh**, T. Magdi Ahmed, A. Al-Othman, State of the art of fuel cells, Chapter 4, Renewable Energy - Volume 3: Energy Storage Systems - Fuel Cells, Supercapacitors, and Batteries, 1st Edition, ISBN: 978-0-443-29875-2, (2026) 87-117. https://doi.org/10.1016/B978-0-443-29875-2.00021-8.

5- T. Magdi Ahmed, S.M. Asaad, A. Ka'ki, **M. Tawalbeh**, A. Al-Othman, Analysis of fuel cells, Chapter 5, Renewable Energy - Volume 3: Energy Storage Systems - Fuel Cells, Supercapacitors, and Batteries, 1st Edition, ISBN: 978-0-443-29875-2, (2026) 119-141. https://doi.org/10.1016/B978-0-443-29875-2.00005-X.

6- T. Magdi Ahmed, A.Ali, A. Ka'ki, **M. Tawalbeh**, A. Al-Othman, Case study on fuel cells, Chapter 6, Renewable Energy - Volume 3: Energy Storage Systems - Fuel Cells, Supercapacitors, and Batteries, 1st Edition, ISBN: 978-0-443-29875-2, (2026) 143-167. https://doi.org/10.1016/B978-0-443-29875-2.00020-6.

7- T.M.M. Abdellatief, **M. Tawalbeh**, Tareq Salameh, SWOT analysis of batteries, Chapter 21, Renewable Energy - Volume 3: Energy Storage Systems - Fuel Cells, Supercapacitors, and Batteries, 1st Edition, ISBN: 978-0-443-29875-2, (2026) 481-498. https://doi.org/10.1016/B978-0-443-29875-2.00001-2.

8- S. Abdulkarim, K. Abu Amarah, C. Merhi, I. Shomope, **M. Tawalbeh**, A. Al-Othman, Utilization of municipal wastewater for energy recovery, Chapter 2, Transformation of Liquid Waste to Energy, Methods, Challenges, and Opportunities, Volume 2 in Woodhead Series in Bioenergy, 1st Edition, ISBN: 978-0-443-33683-6, (2026) 21-44. https://doi.org/10.1016/B978-0-443-33683-6.00013-9.

9- J.H. Aljehani, M.K.Mostafa, S. Abdulkarim, G. Piliposyan, A. Al-Othman, **M. Tawalbeh**, Conversion of livestock waste to energy: New technological transformation for energy recovery, Chapter 8, Transformation of Solid Waste to Energy, Methods, Challenges, and Opportunities, Volume 1 in Woodhead Series in Bioenergy, 1st Edition, ISBN: 978-0-443-33683-6, (2026) 217-240. https://doi.org/10.1016/B978-0-443-29275-0.00016-5.

10- L. Abbas, M. Hany, M. Alnaqbi, A. Al-Othman, **M. Tawalbeh**, Chapter 2 - Electrochemical biosensing, Electrochemistry and Photo-Electrochemistry of Nanomaterials Fundamentals and Applications (2025) 35-57. https://doi.org/10.1016/B978-0-443-18600-4.00002-8.

11- L. Shahin, A. ElGazar, T. Al Hazaimeh, A. Ali, A. Al-Othman, **M. Tawalbeh**, Chapter 3 - Solar cells at the nanoscale, Electrochemistry and Photo-Electrochemistry of Nanomaterials Fundamentals and Applications (2025) 59-88. https://doi.org/10.1016/B978-0-443-18600-4.00004-1.

12- H.A. Khan, B. Al Kurdi, H. Alqassem, A. Ali, A.Al-Othman, **M.Tawalbeh**, Chapter 5 - Nanomaterials for fuel cells' electrodes, Electrochemistry and Photo-Electrochemistry of Nanomaterials Fundamentals and Applications (2025) 133-158. https://doi.org/10.1016/B978-0-443-18600-4.00006-5.

13- Z. Alqallaf, H. Bukhatir, F. D'Souza, A. Ali, A. Al-Othman, **M. Tawalbeh**, Chapter 10 - Nano/photoelectrochemistry for environmental applications, Electrochemistry and Photo-Electrochemistry of Nanomaterials Fundamentals and Applications (2025) 333-357. https://doi.org/10.1016/B978-0-443-18600-4.00011-9.

14- R.A. Aly, A. Alaamer, T. Ashira, S.N. Alkhajeh, A. Ali, A. Al-Othman, **M. Tawalbeh**, Chapter 13 -Nanophoto/electrochemistry for green energy production, Electrochemistry and Photo-Electrochemistry of Nanomaterials Fundamentals and Applications (2025) 427-452. https://doi.org/10.1016/B978-0-443-18600-4.00014-4.

15- G. Piliposyan, L. Jaber, A. Jabr, C. Merhi, S. Abdulkarim, M. Sabri, A. Al-Othman, **M. Tawalbeh**, Biofuel in high temperature fuel cells, Reference Module in Materials Science and Materials Engineering, Elsevier (2025) 499-511.

16- Z. Alinejad, S.N. Asl, **M. Tawalbeh**, A. Al-Othman, Green Hydrogen and Material Development for Fuel Cells, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 1-14. https://doi.org/10.1016/B978-0-443-15738-7.00100-8.

17- **M. Tawalbeh**, A. Al-Othman, A.A. Ali, M. Sabri, M.B. Hammad, B. Albiss, A. Al-Othman, An Overview of Bionanocomposite Materials and Their Characterization Techniques, Reference Module in Materials Science and Materials Engineering, Elsevier (2025) 330-342. https://doi.org/10.1016/B978-0-443-15738-7.00092-1.

18- R.R. Richi, Z.A. Saib, A.A. Ali, M. Sabri, B. Aljawrneh, A. Al-Othman, **M. Tawalbeh**, Green Polymers: Overview, Characterizations, and Biomedical Applications, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 382-396. https://doi.org/10.1016/B978-0-443-15738-7.00094-5.

19- H. Mortada, H. Kerrouchi, A. Al-Othman, **M. Tawalbeh**, Pellet as Biofuel: An Overview, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 1-15. https://doi.org/10.1016/B978-0-443-15738-7.00097-0.

20- A.A. Ali, M. Sabri, **M. Tawalbeh**, A. Al-Othman, Water Treatment Applications of Green Polymers, Reference Module in Materials Science and Materials Engineering, Elsevier (2025) 453-469. https://doi.org/10.1016/B978-0-443-15738-7.00082-9.

21- A. Atallah, S.A. Mansour, N. Nowshad, M. Tasnia, A. Ali, **M. Tawalbeh**, A. Al-Othman, Green Hydrogen and Renewable Energy Resources, Reference Module in Materials Science and Materials Engineering, Elsevier (2025) 272-286. https://doi.org/10.1016/B978-0-443-15738-7.00078-7.

22- S. Tareq, **M. Tawalbeh**, A. Ka'ki, B. Aljawrneh, A. Al-Othman, Green Phase Change Materials, Reference Module in Materials Science and Materials Engineering, Elsevier (2025) 578-587. https://doi.org/10.1016/B978-0-443-15738-7.00074-X.

23- H.A. Almaazmi, **M. Tawalbeh**, A. Al-Othman, S.M. Asaad, Different Routes for Biofuels from Wastewater, Reference Module in Materials Science and Materials Engineering, Elsevier (2025) 483-498. https://doi.org/10.1016/B978-0-443-15738-7.00071-4.

24- H. Kerrouchi, H. Mortada, A. Al-Othman, **M. Tawalbeh**, Bamboo as Green Material: Introduction, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 1-10. https://doi.org/10.1016/B978-0-443-15738-7.00077-5.

25- S.A. Mansour, A. Atallah, M. Tasnia, N. Nowshad, A. Al-Othman, A. Ka'ki, **M. Tawalbeh**, Green Materials for Desalination, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 1-16. https://doi.org/10.1016/B978-0-443-15738-7.00088-X.

26- A. Ka'ki, A.Al-Othman, **M.Tawalbeh**, W. Alhassoun, S. Salah, N. Ayoub, S. Ayoub, Green Materials for Fuel Cells, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 1-12. https://doi.org/10.1016/B978-0-443-15738-7.00073-8.

27- B.Aljawrneh, B. A Albiss, Y.S. Ocak, **M. Tawalbeh**, A. Al-Othman, Green Materials in Supercapacitors, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 1-10. https://doi.org/10.1016/B978-0-443-15738-7.00065-9.

28- A.A. Ali, **M. Tawalbe**h, A. Al-Othman, N. Halalsheh, Green Materials for Water Treatment and Remediation, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 1-11. https://doi.org/10.1016/B978-0-443-15738-7.00042-8.

29- A. Alremeithi, **M. Tawalbeh**, S.M. Asaad, A. Al-Othman, Biohydrogen Production From Waste Solid Materials, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 1-12. https://doi.org/10.10.1016/B978-0-443-15738-7.00056-8.

30- C. Merhi, S. Abdulkarim, G. Piliposyan, **M. Tawalbeh**, N. Halalsheh, A. Al-Othman, Chapter 14 - Proteomics Monitoring of Microbes During Biodegradation of Environmental Contaminants, Microbial Bioremediation and Multiomics Technologies for Sustainable Development, Volume 13, Edited by Fuad Ameen; Sartaj Ahmad Bhat; Vineet Kumar, Royal Society of Chemistry, (2024) 393-413. https://doi.org/10.1039/BK9781837673131-00393.

31- G. Piliposyan, C. Merhi, S. Abdulkarim, **M. Tawalbe**h, N. Halalsheh, A. Al-Othman, Chapter 17: Metabolomics: An Approach to Decode the Insight of Organism Functioning in Polluted Environments, Microbial Bioremediation and Multiomics Technologies for Sustainable Development, Volume 13, Edited by Fuad Ameen; Sartaj Ahmad Bhat; Vineet Kumar, Royal Society of Chemistry, (2024) 458-480. https://doi.org/10.1039/BK9781837673131-00458.

32- M.B. Shahin, E. Ismail, N. Eltaher, M. Alnaqbi, A. Al-Othman, **M. Tawalbeh**, chapter 2 - Microbes in Membrane Technologies: Prospects for Sustainable Wastewater Treatment, Microbial Nexus for Sustainable Wastewater Treatment: Resources, Efficiency, and Reuse, 1st Edition, Edited By: Vineet Kumar, Sunil Kumar, Pradeep Verma, Sartaj Ahmad Bhat, CRC Press (2024) 22-46. https://doi.org/10.1201/9781003441069.

33- A. Ali, A. Al-Othman, **M. Tawalbeh**, chapter 4 - Polymer membranes: general principles and applications in fuel cells, Polymer Membranes: Increasing Energy Efficiency, Edited by: Mahmoud Atef Abdulhamid, Walter de Gruyter GmbH & Co KG, (2024) 115-138. https://doi.org/10.1515/9783110796032-004.

34- W. Taief, A. Al-Othman, **M. Tawalbeh**, The Application of Machine Learning for Green Hydrogen Production, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 1-12. https://doi.org/10.1016/B978-0-443-15738-7.00030-1.

35- S.M. Asaad, **M. Tawalbeh**, A. Al-Othman, Emerging Biofuels, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 1-14. https://doi.org/10.1016/B978-0-443-15738-7.00018-0.

36- B. Aljawrneh, B.A. Albiss, Y.S. Ocak, **M. Tawalbeh**, A. Al-Othman, Two-Dimensional Energy Materials, Emerging Biofuels, Reference Module in Materials Science and Materials Engineering, Elsevier (2024) 1-14.

37- S.M. Asaad, **M. Tawalbeh**, A. Ali, S.R. Al Kindi, A. Al-Othman, Definition of bioenergy, Chapter 3.1, Renewable Energy— Volume 2: Wave, Geothermal, And Bioenergy, 1st Edition, ISBN: 978-0-323-95211-8, 215-243 (2024). https://doi.org/10.1016/B978-0-323-95211-8.00004-X.

38- **M. Tawalbeh**, S.M. Asaad, A. Ali, S.R. Al Kindi, A. Al-Othman, Developments of bioenergy, Chapter 3.2, Renewable Energy— Volume 2: Wave, Geothermal, And Bioenergy, 1st Edition, ISBN: 978-0-323-95211-8, 245-273 (2024). https://doi.org/10.1016/B978-0-323-95211-8.00006-3.

39- S.M. Asaad, **M. Tawalbeh**, A. Ali, A. Al-Othman, Applications of bioenergy, Chapter 3.3, Renewable Energy— Volume 2: Wave, Geothermal, And Bioenergy, 1st Edition, ISBN: 978-0-323-95211-8, 275-293 (2024). https://doi.org/10.1016/B978-0-323-95211-8.00001-4.

40- R. Darra, **M. Tawalbeh**, A. Ali, S.M. Asaad, A. Al-Othman, Review of bioenergy systems, Chapter 3.4, Renewable Energy— Volume 2: Wave, Geothermal, And Bioenergy, 1st Edition, ISBN: 978-0-323-95211-8, 295-316 (2024). https://doi.org/10.1016/B978-0-323-95211-8.00019-1.

41- A. Ali, **M. Tawalbeh**, S.M. Asaad, R. Darra, A. Al-Othman, Case studies and analyses of bioenergy systems, Chapter 3.5, Renewable Energy— Volume 2: Wave, Geothermal, And Bioenergy, 1st Edition, ISBN: 978-0-323-95211-8, 317-224 (2024). https://doi.org/10.1016/B978-0-323-95211-8.00008-7.

42- **M. Tawalbeh**, A. Ali, S.M. Asaad, R. Darra, A. Al-Othman, Simulation and modeling of bioenergy systems, Chapter 3.6, Renewable Energy— Volume 2: Wave, Geothermal, And Bioenergy, 1st Edition, ISBN: 978-0-323-95211-8, 335-355 (2024). https://doi.org/10.1016/B978-0-323-95211-8.00018-X.

43- S.A. Samrajyam, J.I.Sheikh, A. Al-Othman, **M. Tawalbeh**, Fuel cell technology for green energy generation, Book Chapter, Elsevier Book Chapter 18, Green Membrane Technologies towards Environmental Sustainability, ISBN: 978-0-323-95165-4, 555-573 (2023). https://doi.org/10.1016/B978-0-323-95165-4.00023-9.

44- D. Al-Muqbel, M. Otifi, R. Aly, R. Darra, A. Al-Othman, **M. Tawalbeh**, N. Halalsheh, Bioremediation of petrochemical sludge from soils, Book Chapter, Elsevier Book Chapter 15, Metagenomics to Bioremediation, Applications, Cutting Edge Tools, and Future

Outlook, Developments in Applied Microbiology and Biotechnology, 1st Edition, ISBN: 978-0-323-96113-4, 379-402 (2023). https://doi.org/10.1016/B978-0-323-96113-4.00009-3.

45- R. Darra, M. Bin Hammad, F. Alshamsi, S. Alhammadi, W. Al-Ali, A. Aidan, **M. Tawalbeh**, N. Halalsheh, A. Al-Othman, Wastewater treatment processes and microbial community, Book Chapter, Elsevier Book Chapter 13, Metagenomics to Bioremediation, Applications, Cutting Edge Tools, and Future Outlook, Developments in Applied Microbiology and Biotechnology, 1st Edition, ISBN: 978-0-323-96113-4, 379-402 (2023). https://doi.org/10.1016/B978-0-323-96113-4.00009-3.

46- M. Al-Murisi, D. Al-Muqbel, A. Al-Othman, **M. Tawalbeh**, Integrated microbial desalination cell and microbial electrolysis cell for wastewater treatment, bioelectricity generation, and biofuel production: Success, experience, challenges, and future prospects, Book Chapter, Elsevier Book Chapter 6 "Integrated Environmental Technologies for Wastewater Treatment and Sustainable Development". ISBN 978-0-323-91180-1, 145-165 (2022). https://doi.org/10.1016/B978-0-323-91180-1.00026-0.

47- A. Alhajar, **M. Tawalbeh**, D. Arjomand, N.A. Rahman, H. Khan, A.Al-Othman, Integrating forward osmosis into microbial fuel cells for wastewater treatment, Book Chapter, Elsevier Book Chapter 14 "Integrated Environmental Technologies for Wastewater Treatment and Sustainable Development". ISBN 978-0-323-91180-1, 321-335 (2022). https://doi.org/10.1016/B978-0-323-91180-1.00016-8.

48- **M. Tawalbeh**, H. Azfar Khan, A. Al Hajar, A. Al-Othman, Applications of metamaterials, Book Chapter, Elsevier, Encyclopedia of Smart Materials 3 (2022) 11-24. https://doi.org/10.1016/B978-0-12-815732-9.00089-9.

49- A. Al-Othman, **M. Tawalbeh**, O. Temsah, H. Azfar Khan, A. Al Hajar, Metamaterials: Classifications and characteristics, Book Chapter, Elsevier, Encyclopedia of Smart Materials 3 (2022) 46-56. https://doi.org/10.1016/B978-0-12-815732-9.00088-7.

50- **M. Tawalbeh**, A. Al-Othman, N. Ashoobi, M. Alkasrawi, Classifications of thermal energy storage materials, Book Chapter, Elsevier. Encyclopedia of Smart Materials 2 (2022) 450-469. https://doi.org/10.1016/B978-0-12-815732-9.00064-4.

51- A. Al-Othman, **M. Tawalbeh**, O. Temsah, M. Al-Murisi, Industrial challenges of MOFs in energy applications, Book Chapter, Elsevier, Encyclopedia of Smart Materials 2 (2022) 535-543. https://doi.org/10.1016/B978-0-12-815732-9.00030-9.

Conference Presentations:

1. "Optimizing Hydrogen Production in PEM Water Electrolysis: A Comparative Analysis of Advanced Optimization Techniques" 20th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES), Oct. 5-10, Dubrovnik, Croatia.
2. "Experimental Design in PEM Fuel Cell Composite Membrane for Better Water Management" 20th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES) Oct. 5-10, Dubrovnik, Croatia.
3. "Application of Machine Learning Techniques to Predict the Higher Heating Value of Date Palm Waste as Biofuels" 2025 International Conference on Bioengineering Engineering -

2025 Advances in Science and Engineering Technology (ASET) International Conferences, Sep. 15-18, 2025, HCT – Dubai, UAE.

4. "Polyaniline-MXene-PVDF Membranes for Biofuel cells Applications" 2025 International Conference on Bioengineering Engineering - 2025 Advances in Science and Engineering Technology (ASET) International Conferences, Sep. 15-18, 2025, HCT – Dubai, UAE.
5. "Investigating AI and Infrastructure for Efficient Food Waste Management" 2nd International Innovation X.0 Forum (IIF-2025), April 9-10, 2025, University of Sharjah, Sharjah, United Arab Emirates.
6. "Carbon Nanotubes-Based Membranes for High Temperature PEM Fuel Cells" 2nd International Innovation X.0 Forum (IIF-2025), April 9-10, 2025, University of Sharjah, Sharjah, United Arab Emirates,
7. "Alginate-tungsten trioxide-graphene based composite membranes with enhanced conductivity and mechanical properties for fuel cells applications"17th International Conference on Sustainable Energy & Environmental Protection (SEEP 2025), Brunel University of London, Kingston Lane, Uxbridge, United Kingdom, July. 28-31, 2025.
8. "Enhanced Hydrogen Production from Methane Pyrolysis Using CatBoost with Reptile Search Algorithm Optimization" 17th International Conference on Sustainable Energy & Environmental Protection (SEEP 2025), Brunel University of London, Kingston Lane, Uxbridge, United Kingdom, July. 28-31, 2025.
9. "Design of Experiments for Synthesis and Optimization of PEM Fuel Cell Membranes" 17th International Conference on Sustainable Energy & Environmental Protection (SEEP 2025), Brunel University of London, Kingston Lane, Uxbridge, United Kingdom, July. 28-31, 2025.
10. "Collagen/Chitosan Membranes for PEM Fuel Cell Application" 21st International conference on Advanced Nanomaterials (ANM2024) 24-26 July 2024, Universidade de Aveiro, 3810-193 Aveiro, Portugal.
11. "Lignin/Nanocellulose composite membranes for polymer electrolyte membrane fuel cells" 21st International conference on Advanced Nanomaterials (ANM2024) 24-26 July 2024, Universidade de Aveiro, 3810-193 Aveiro, Portugal.
12. "Proton Conductivity Studies of H-ZSM-5 /PVDF Composite Membranes for PEM Fuel Cells" 21st International conference on Advanced Nanomaterials (ANM2024) 24-26 July 2024, Universidade de Aveiro, 3810-193 Aveiro, Portugal.
13. "Alginate Modified Biomaterial Membranes for Fuel Cells Applications" the 6th International Multiconference on Advances in Science and Engineering Technology (ASET 2024) June 3-5, 2024, HCT – Dubai, UAE.
14. "Collagen Based Biomaterials as Membranes for PEM Fuel Cells Applications" the 6th International Multiconference on Advances in Science and Engineering Technology (ASET 2024) June 3-5, 2024, HCT – Dubai, UAE
15. "Bioconversion of Carbon Dioxide to Value-Added Products Using Saccharomyces Cerevisiae" the 6th International Multiconference on Advances in Science and Engineering Technology (ASET 2024) June 3-5, 2024, HCT – Dubai, UAE.
16. "MXene-PVDF Composite for High Temperature PEM Fuel Cells Applications" The 6th International Conference on Alternative Fuels, Energy & Environment (ICAFEE 2023): Future and Challenges, 6-8 October 2023, Erciyes University, Kayseri, Türkiye.

17. "Modified Sodium Alginate Polymer Electrolyte Films as Proton Exchange Membranes" The 6th International Conference on Alternative Fuels, Energy & Environment (ICAFEE 2023): Future and Challenges, 6-8 October 2023, Erciyes University, Kayseri, Türkiye.

18. "Novel Chitosan Based Composite Membranes for High Temperature Fuel Cells Applications" 14th International Conference on Sustainable Energy & Environmental Protection (SEEP2022) 12th – 15th of September 2022, Brunel University London, Kingston Lane, Uxbridge, UB8 3PH, UK.

19. "Biodegradable Membranes for PEM Fuel Cells Applications" 14th International Conference on Sustainable Energy & Environmental Protection (SEEP2022) 12th – 15th of September 2022, Brunel University London, Kingston Lane, Uxbridge, UB8 3PH, UK.

20. "Optimization techniques for electrochemical devices for energy applications" 14th International Conference on Sustainable Energy & Environmental Protection (SEEP2022) 12th – 15th of September 2022, Brunel University London, Kingston Lane, Uxbridge, UB8 3PH, UK.

21. "Emerging technologies and prognostic studies for fuel cells and direct hydrocarbon fuel cells" 8th International Conference on Material Science & Smart Materials "MSSM 2022" July 11-13, 2022, Brunel University London, Kingston Lane, Uxbridge, UB8 3PH, UK.

22. "Proton Conductivity studies on Covalent organic frameworks (COFs) for High Temperature Fuel Cells Applications" 8th International Conference on Material Science & Smart Materials "MSSM 2022" July 11-13, 2022, Brunel University London, Kingston Lane, Uxbridge, UB8 3PH, UK.

23. "Highly proton conductive membranes based on lignin–ZrP–PTFE composite for high temperature PEM fuel cells" 13th International Conference on Sustainable Energy & Environmental Protection (SEEP 2021), University of Natural Resources and Life Sciences (BOKU), Vienna, Austria, Sep. 13-16, 2021.

24. "Hybrid photovoltaics/solar chimney seawater desalination plant" 13th International Conference on Sustainable Energy & Environmental Protection (SEEP 2021), University of Natural Resources and Life Sciences (BOKU), Vienna, Austria, Sep. 13-16, 2021.

25. "Testing different types of scrap metallic wastes as electrodes for electrocoagulation treatment of grey wastewater" 13th International Conference on Sustainable Energy & Environmental Protection (SEEP 2021), University of Natural Resources and Life Sciences (BOKU), Vienna, Austria Sep. 13-16, 2021.

26. "Phosphate removal from aqueous solutions by adsorption onto black grape seeds" 13th International Conference on Sustainable Energy & Environmental Protection (SEEP 2021), University of Natural Resources and Life Sciences (BOKU), Vienna, Austria, Sep. 13-16, 2021.

27. "A novel numerical simulation model for the PVT water system in the GCC region" 3rd Advances in Science and Engineering Technology (ASET 2020) multi-conferences, Higher Colleges of Technology Dubai, United Arab Emirates, Feb. 04-06, 2020.

28. "Life Cycle Analysis Comparison between Single Crystalline Solar Cells and poly Crystalline Gallium in UAE" 3rd Advances in Science and Engineering Technology (ASET 2020) multi-conferences, Higher Colleges of Technology Dubai, United Arab Emirates, Feb. 04-06, 2020.

29. "Novel composite membranes based on solid proton conductors and ionic liquids for high temperature fuel cells applications" 12th International Conference on Sustainable Energy &

Environmental Protection (SEEP 2019), University of Sharjah, Sharjah, UAE, Nov. 17-21, 2019.

30. "Recent developments in microbial desalination cells for water desalination and power generation" 12th International Conference on Sustainable Energy & Environmental Protection (SEEP 2019), University of Sharjah, Sharjah, UAE, Nov. 17-21, 2019.

31. "Process streams integration for energy saving in the process of bioethanol production from paper mill sludge" 12th International Conference on Sustainable Energy & Environmental Protection (SEEP 2019), University of Sharjah, Sharjah, UAE, Nov. 17-21, 2019.

32. "Bioethanol Production from Dates-Refuse: Simulation Study for UAE" 12th International Conference on Sustainable Energy & Environmental Protection (SEEP 2019), University of Sharjah, Sharjah, UAE, Nov. 17-21, 2019.

33. "Novel composite membranes based on polyaniline/ionic liquids for PEM fuel cells applications" 6th International Conference on Materials Science & Smart Materials (MSSM2019) Aston University, Birmingham, UK July 24-26, 2019.

34. "Kinetics Study of the Digestion of Magnesium Chloride Dihydrate in a Molten Salt Electrolyte" 6th International Conference on Materials Science & Smart Materials (MSSM2019) Aston University, Birmingham, UK July 24-26, 2019.

35. "Modeling the transport of CO_2, N_2 and their binary mixtures through thin silicalite-1 membrane using Maxwell−Stefan equations" 6th International Conference on Materials Science & Smart Materials (MSSM2019) Aston University, Birmingham, UK, July 24-26, 2019.

36. "Zirconium Phosphate-Ionic Liquid Composite Membranes for PEM Fuel Cells Operating at 200°C" 8th Global Conference on Global Warming (GCGW-2019) April 22-25, 2019 Doha, Qatar, 332 – 334.

37. "Parametric study of a single effect lithium bromide-water absorption chiller powered by a geothermal heat source" The International Conference on Energy, Water & Environmental Sciences (ICEWES 2018) Ras Al Khaimah-UAE, November 13-15, 2018.

38. "Simulation of a residential space cooling system by geothermal energy in the UAE" The International Conference on Energy, Water & Environmental Sciences (ICEWES 2018) Ras Al Khaimah-UAE, November 13-15, 2018.

39. "Graphene oxide - Nafion composite membrane for effective methanol crossover reduction in passive direct methanol fuel cells" 5th International Conference On Renewable Energy Generation and Applications, (ICREGA'18), Al Ain, Abu Dhabi, United Arab Emirates. Feb. 26th to 28th 2018.

40. "Thermodynamic analysis of lithium bromide absorption chiller driven by geothermal energy" 5th International Conference on Renewable Energy: Generation and Applications, (ICREGA'18), Al Ain, Abu Dhabi, United Arab Emirates. Feb. 26th to 28th 2018.

41. "Experimental and numerical studies of heat transfer using three different types of nanofluid in concentric tube heat exchanger" 5th International Conference on Renewable Energy: Generation and Applications (ICREGA'18), Al Ain, Abu Dhabi, United Arab Emirates. Feb. 26th to 28th 2018.

42. "Novel GO/Nafion/ZrP composite membrane for effective methanol crossover reduction in pDMFC," 7th Invitational Colloquium on Fuel Cells, Aug. 15th, 2017, Ottawa, Canada.

43. "Graphene oxide – Nafion composite membrane for effective methanol crossover reduction in pDMFC" ICANM2017: International Conference & Exhibition on Advanced & Nano Materials, Toronto, Canada, Aug. 7th to 9th 2017.

44. "Graphene/ZrP/PTFE composite membranes for passive DMFC" 11TH International Conference on Composite Science and Technology (ICCST 11), 4th to 6th April 2017, Sharjah, UAE.

45. "Graphene Nafion composite membrane as an effective membrane for passive DMFC" 11TH International Conference on Composite Science and Technology (ICCST 11), 4th to 6th April 2017, Sharjah, UAE.

46. Design and modeling of a novel integrated CSP membrane distillation desalination system. The Fifth International Conference on Water, Energy and Environment (ICWEE/5), Sharjah, UAE, February 28- March 2 ,2017.

47. "Modeling the diffusion of CO_2, N_2 and their binary mixtures across silicalite-1 zeolite membrane using Maxwell-Stefan (M-S) Equations" 63rd Canadian Chemical Engineering Conference, Oct. 20th to 23rd, 2013 Frederiction, NB, Canada.

48. "Separation of greenhouse gases using MFI type silicalite-1 zeolite membranes" 63rd Canadian Chemical Engineering Conference, Oct. 20th to 23th, 2013 Frederiction, NB, Canada.

49. "Separation of CO_2/N_2 and CO_2/CH_4 Gas mixtures with new silicalite-1 adsorbent membranes synthesized on a novel support", 11th Fundamentals of Adsorption Conference, May 19th to 24th, 2013, Baltimore, Maryland, USA.

50. "Silicalite Adsorbent Membranes for Separation of CO_2 and N_2 Gases" AICHE 2012 Annual Meeting Conference, Oct. 28th to Nov. 2nd, 2012, Pittsburgh, PA, USA.

51. "Synthesis, Characterization and Application of Novel Inorganic Membranes Derived from Sepiolite or Zeolite over Porous Support" EUROCLAY 2011 European Clay Conference June 26th to July 1st, 2011, Antalya, Turkey.

52. "Novel Inorganic Membranes for CO_2 and N_2 Separation" 3rd IUPAC Conference on Green Chemistry, August 15th to18th, 2010, Ottawa, Ontario, Canada.

53. "Synthesis, morphology characterization and gas permeation properties of new inorganic membrane" 16th International Zeolite Conference joint with the 7th International Mesostructured Materials (IZC16 – IMMS7) July 4th to 9th, 2010, Sorrento, Italy.

54. "Thermal properties of electrolytic magnesium production feed" 134 Minerals, Metals & Materials Society Annual Meeting & Exhibition (TMS 2005) Feb. 13th to 17th, 2005, San Francisco, California, USA.

55. "Formation of MgOHCl during dehydration of magnesium chloride hydrates by contacting with molten salt" Conference of Metallurgists (COM 2004) Aug. 22th to 25th, 2004, Hamilton, ON, Canada.