

Personal Information

Full Name: Mohammed Faraj Saeid
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Education

2023-ongoing **Ph.D. Degree**

Chemical Engineering, major field (Hydrogen Storage)

Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA), Gambang, Malaysia

- Awarded the Malaysia International Scholarship (MIS 2023) as the first Libyan student to receive this honor, recognizing outstanding academic achievement and research potential.
- *PhD thesis submitted; viva voce scheduled for December 2025 (expected completion upon defense).*

2018-2019 **M.Sc. Degree (with CGPA of 3.68)**

Process Plant Operation

Universiti Malaysia Pahang Al-Sultan Abdullah, Gambang, Malaysia

2011-2016 **B.Sc. Degree (with CGPA of 69.6%)**

Chemical Engineering

University of Tobruk, Tobruk, Libya

Work Experience

- **July 2018 – Present, Third Specialist in Chemical Engineering, Brega Petroleum Marketing Company, Tobruk, Libya**
- **June 2021 – April 2022, Lecturer, Petroleum Engineering Department, University of Tobruk, Tobruk, Libya**
- **March 2022 – August 2022, Head of General Department, The Higher Institute of Civil Aviation Technologies– Tobruk – Libya.**
- **May 2022 – September 2022, General University Registrar, United Libyan European University ULEU, Tobruk - Libya.**
- **November 2021 – May 2022, Advisory Board Member, Journal of Global Scientific Research (ISSN: 2523-9376), Global Scientific Journals MZM Resources, No 5-m, JLN Hentian Kajang, 43000 Kajang, Selangor D.E, Malaysia.**

Guest Speaker & Facilitator

- **Guest lecturer** in the Global Classroom Session for the course (BPS2163 Ethics and Leadership in Safety), organized by the Faculty of Industrial Sciences and Technology, College of Computing and Applied Sciences, Universiti Malaysia PAHANG, Malaysia, November 2022.
- **Guest Speaker** in the Online Publication Workshop on the topic (**STEP BY STEP GUIDE TO PUBLISH YOUR MANUSCRIPT**), organized by the Higher Institute of Civil Aviation Technologies -Tobruk, Libya, September 2022.
- **Facilitator** of the Online Workshop on the topic (**HOW TO WRITE A RESEARCH PROPOSAL**), presented by **Assoc. Prof. Ts. Dr. Herma Dina Setiabudi** and organized by the Higher Institute of Civil Aviation Technologies -Tobruk, Libya, September 2022.

Trainings and Workshops Attended

- **Chemical Process Design and Equipment**, Institut Teknologi Petroleum PETRONAS (INSTEP), November 2018, Terengganu, Malaysia; Certification of Completion.
- **Process Safety Management**, Institut Teknologi Petroleum PETRONAS (INSTEP), December 2018, Terengganu, Malaysia; Certification of Completion.

- **Plant Integrity, Maintenance and Troubleshooting**, Institut Teknologi Petroleum PETRONAS (INSTEP), March 2019, Terengganu, Malaysia; Certification of Completion.
- **Plant Utilities**, Institut Teknologi Petroleum PETRONAS (INSTEP), April 2019, Terengganu, Malaysia; Certification of Completion.
- **Process and Production Control**, Institut Teknologi Petroleum PETRONAS (INSTEP), April 2019, Terengganu, Malaysia; Certification of Completion.
- **Systematic Literature Review (Online Workshop)**, Sea Pearl for Education SDN.BHD in collaboration with Universiti Pendidikan Sultan Idris (UPSI), February 2021, Kuala Lumpur, Malaysia.
- **Certificate of I-Got achievement**, for having successfully graduated on time in 2019, Institute of Postgraduate Studies. Universiti Malaysia Pahang.

Evaluation Committee membership

- Evaluation committee member (Reviewer) of the scientific Libyan Innovation Prize 2020, Tripoli, Libya
- Evaluation committee member (Reviewer) of the Third Engineering Conference of Engineering Professions Syndicate in Zawiyah, December 14-15, 2021, Zawiyah, Libya.
- Evaluation committee member (Reviewer) of Fourth Scientific Conference of Oil & Gas, University of Agdabia, February 22-23, 2022, Agdabia, Libya.

Language and Personal Skills

Mother tongue(s): Arabic

Foreign language(s): Proficient in the English language command (speaking, reading, and writing).

Digital Skills

- Very familiar and comfortable with Matlab, Aspen Plus, Microsoft Office packages, and internet applications.

Problem Solving Skills and Leadership Skills

- Sharp thinking, clear mind, and fair judgment
- High level of leadership skills
- Team Work
- Communication
- Flexibility
- Time Management

Research Experience

- 1. Research Project Title:** *Hydrogen Storage in MgH₂ Catalyzed by Ni nanoparticles and hollow silica spheres*; **Institution:** In collaboration between Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA) and Universiti Malaysia Terengganu (UMT); **Role:** Research Leader. **Status:** (Expected to commence in November 2025).
- 2. Research Project Title:** *Hydrogen Storage in MgH₂ Catalyzed by Fe nanoparticles and fibrous nano-silica*; **Institution:** In collaboration between Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA) and Universiti Malaysia Terengganu (UMT); **Role:** Research Leader. **Status:** (Expected to commence in December 2025).
- 3. Research Project Title:** *Hydrogen Storage in MgH₂ Catalyzed by Ni nanoparticles and fibrous nano-silica*; **Institution:** In collaboration between Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA) and Universiti Malaysia Terengganu (UMT); **Role:** Research Leader. **Status:** (Expected to commence in January 2026).
- 4. Research Project Title:** *Synthesis and Characterization of Metal Hydride Nanoconfined Hollow Nano Silica for Hydrogen Storage Systems*; **Institution:** Faculty of Chemical and Process Engineering Technology, Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA); **Role:** PhD Student. **Status:** (Ongoing).

Project summary: Hydrogen is a clean, sustainable energy carrier, but its storage remains a major challenge. In this study, hollow silica spheres (HSS) were synthesized via a sol-gel/emulsion method using CTAB as a surfactant to stabilize TEOS hydrolysis. Although HSS offers a promising scaffold for hydrogen storage due to its porosity, its low capacity limits

practical use. To enhance performance, iron (Fe) was incorporated into HSS to improve hydrogen dissociation and increase active sites. Magnesium hydride (MgH_2), known for high hydrogen capacity, suffers from high decomposition temperatures and slow kinetics. Doping MgH_2 with Fe-HSS significantly improved its performance. The 10 wt.% Fe-HSS (7Fe-HSS) composite reduced the desorption temperature to $320\text{ }^\circ\text{C}$ — $105\text{ }^\circ\text{C}$ and $30\text{ }^\circ\text{C}$ lower than pure and milled MgH_2 , respectively. It also absorbed 6.09 wt.% H_2 in 2 minutes, outperforming milled MgH_2 (4.66 wt.%), and desorbed 4.85 wt.% H_2 at $320\text{ }^\circ\text{C}$ in 60 minutes, compared to just 0.4 wt.% for milled MgH_2 . The activation energy dropped to 115 kJ/mol, and the enthalpy change was reduced by 58.4 kJ/mol. XRD confirmed FeSi_2 formation, contributing to enhanced storage, while cyclic tests demonstrated good stability over five cycles.

5. **Research Project Title:** *Simulation Study on the Effect of Different Reactor Schemes and Operating Conditions to Produce Butanol by Hydrogenation of Butanal*; **Institution:** Faculty of Chemical and Natural Resources Engineering, Universiti Malaysia Pahang; **Role:** Master Student; **Duration:** 2018-2019; **Status:** (Completed).

Project summary: A simulation using Aspen Plus was conducted to assess the impact of bypassing the second liquid-phase reactor in a butanol production plant due to catalyst blockage. The validated model was used to simulate butanal hydrogenation under various reactor configurations, conditions, and sizes, targeting a total butanal conversion of 99.5%. Conversion improved with higher temperatures and residence time, while pressure mainly influenced the vapor-phase reactor. The original setup (vapor-phase followed by two liquid-phase reactors) achieved 99.5% conversion at $213\text{ }^\circ\text{C}$, $158.5\text{ }^\circ\text{C}$, $159.5\text{ }^\circ\text{C}$ and 21, 16, 16 bar, respectively. Modified configuration I (vapor + one liquid-phase reactor) required $255\text{ }^\circ\text{C}$, $166.5\text{ }^\circ\text{C}$ and 21, 16 bar. Configuration II (single vapor-phase reactor) achieved 99.99% conversion at $285\text{ }^\circ\text{C}$ and 30 bar, exceeding typical industrial limits. Optimal reactor dimensions were 2.75 m diameter and 10.92 m length. Overall, bypassing liquid-phase reactors is feasible if higher operating conditions are acceptable within safety limits.

Publications

Published Articles:

1. **Mohammed Faraj Saeid**, B.A. Abdulkadir, S.Z. Abidin, H.D. Setiabudi. *Nanoconfinement of Magnesium Hydride in Porous Scaffolds for Hydrogen Storage: Kinetics, Thermodynamics, and Future Prospects*. Materials Science in Semiconductor Processing. Volume 188, 15 March 2025, 109225. DOI: <https://doi.org/10.1016/j.mssp.2024.109225>.
2. **Mohammed Faraj Saeid**, B.A. Abdulkadir, M. Ismail, H.D. Setiabudi. *A Bibliometric Analysis of Metal-Based Catalysts for Efficient Hydrogen Production*. Environmental Quality Management. Volume 34, Issue 3, Spring 2025, e70046. DOI: <https://doi.org/10.1002/tqem.70046>.
3. **Mohammed Faraj Saeid**, B.A. Abdulkadir, H.D. Setiabudi. *Enhancing Hydrogen Adsorption Performance of Hollow Silica Spheres through the Addition of Fe: A study on Kinetic and Thermodynamic*. Materials Science in Semiconductor Processing. Volume 192, 15 June 2025, 109458. DOI: <https://doi.org/10.1016/j.mssp.2025.109458>.
4. **Mohammed Faraj Saeid**, B.A. Abdulkadir, M. Ismail, H.D. Setiabudi. *Hydrogen Storage in MgH₂ Catalyzed by Fe Nanoparticles and Hollow Silica Spheres*. Fuel. Volume 400, 15 November 2025, 135635. DOI: <https://doi.org/10.1016/j.fuel.2025.135635>.
5. **Mohammed Faraj Saeid**, B.A. Abdulkadir, Muhammad Ashraf Fauzi, H.D. Setiabudi. *Carbon Materials for Hydrogen Storage: A Bibliometric Analysis on Current Trends and Future Prospects*. Environmental Quality Management. Volume 34, Issue 4, Summer 2025, e70109. DOI: <https://doi.org/10.1002/tqem.70109>.
6. **Mohammed Faraj Saeid**, Ismail Hassan Abdilahi, & Azizan Ramli, *"Risk Assessment of an Ammonia Storage Tank in a Fertilizers Production Plant by Using Bayesian Networks: A Case Study"* Journal of Global Scientific Research in Chemical Engineering 7 (2) 2022/ 2094-2103.

7. **Mohammed Faraj Saeid**, B.A. Abdulkadir, H.D. Setiabudi. *Tailoring Hollow Silica Spheres for Enhanced Hydrogen Adsorption Performance: Role of Synthesis Parameters*. Energy Technology. In Press, DOI: <https://doi.org/10.1002/ente.202500078>.
8. **Mohammed Faraj Saeid**, B.A. Abdulkadir, M. Ismail, H.D. Setiabudi. *Enhanced Hydrogen Storage Properties of MgH₂ through Doping with Titanium-based Catalyst Materials: A Review and Bibliometric Analysis*. Materials Science in Semiconductor Processing. Volume 200, December 2025, 109931, e70109. DOI: <https://doi.org/10.1016/j.mssp.2025.109931>.

Conference Proceedings:

1. **Mohammed Faraj Saeid**, B.A. Abdulkadir, H.D. Setiabudi, *"Biomass-Derived Functional Silica Materials for Hydrogen Storage: A Short Review,"* 3rd International Symposium of Reaction Engineering, Catalysis and Sustainable Energy 2025 (RECASE 2025). It will be published in the special issue of Bulletin of Chemical Reaction Engineering & Catalysis.
2. M. Omar, A. Ramli, K. A. Johari and **Mohammed Faraj Saeid**, *"Risk-based inspection for ammonia storage unit by using PRIMS: a case study,"* Innovative Manufacturing, Mechatronics & Materials Forum 2022 (iM3F 2022), 2022, pp. 45-53, doi: [10.1049/icp.2022.2242](https://doi.org/10.1049/icp.2022.2242).
3. **Mohammed Faraj Saeid** & Sim Yee Chin, *"Simulation of Butanol Production through Hydrogenation of Butanal: Effects of Different Reactor Schemes and Operating Conditions,"* The International Conference for Engineering Sciences and Technology (CEST-2020) No. 3, December 1-3, 2020, Alkhums, Libya.

Accepted Book Chapters for Publication:

1. **Mohammed Faraj Saeid**, B.A. Abdulkadir, H.D. Setiabudi, *"Sustainable Functional Materials for Carbon Capture and Utilization,"* Wiley-Scrivener.

Papers Under the Journal Consideration:

1. **Mohammed Faraj Saeid, B.A. Abdulkadir, H.D. Setiabudi. "*Carbon-based Materials for CO₂ Capture and Conversion: A Review on Research Trends and Future Perspectives*". *Environmental Quality Management*. Under revision.**