

Osama Al-Madanat

PhD degree Industrial Environmental Chemistry

Nanotechnology and
Photocatalysis



Contact

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Scopus (23 Sep 2023)

Scopus ID: 57201636422

Documents 22

Citations (2025) 456

Citations (total) 456

h-index 13

Dr. Al-Madanat is a researcher and educator with a PhD in Chemistry from Leibniz University Hannover (Germany), specializing in nanotechnology, photocatalysis, and environmental applications.

He completed his PhD with a full scholarship from KAAD. Currently, he is serving as an Assistant Professor in the Chemistry Department at Mutah University (Jordan), where he teaches courses in analytical chemistry, instrumental analysis, instrumental methods in industrial chemistry, and material chemistry while supervising cutting-edge research projects.

With an H-index of 13 and a 20+ robust publication record, including numerous Q1 papers in leading journals, his research primarily focuses on solar-driven photocatalysis for environmental remediation, sustainable energy, hydrogen production, water pollutant transformation, sustainable nanomaterials engineering, and advanced nanomaterials.

Dr. Al-Madanat has extensive experience in the synthesis and characterization of catalytic materials, particularly for hydrogen production and water pollutant degradation. An active international peer-reviewer with 52 documented reviews, Dr. Al-Madanat is deeply committed to upholding scientific rigor and promoting high-quality research. He is recognized for contributions to international collaborations and conferences across Europe and the Middle East.

Work History

2024-09 –
current

Assistance professor

Industrial Chemistry Department – Mutah University

2022-02
–
2024-09

Part-time lecturer, and Teaching & Research Assistant

Chemistry Department – Mutah University

- **Teaching the following courses:**

- Quality Assurance for Industrial Chemistry Students.
- Instrumental Analysis for Industrial Chemistry Students.
- Research project.
- General Chemistry 1.
- General Chemistry for Analytical Laboratory Students.
- Analytical Chemistry lab.

Orcid ID:

0000-0002-7107-9460

Web of Science Res. ID:

AGG-9060-2022

Google Scholar

Documents 23

Citations (2023) 166

Citations (total) 346

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ResearchGate

Documents 22

Citations (2023) 163

Citations (total) 318

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Skills

Research and analysis

Excellent

Sample preparation

Excellent

Specimen handling

Excellent

VII. Instrumental Analysis Lab.

VIII. General Chemistry Lab (1) and (2).

- The implementation of exercises and lectures in the field of general, analytical, and organic chemistry, and participation in exams.
- participation in the research work with several working groups.
- Presenting scientific work in international conferences and in specialized journals as well,
- Establishment of a new laboratory in the field of Nanochemistry and Photocatalysis.

Postdoc and Teaching Assistant

*Institute of Technical Chemistry at Leibniz University
Hannover, Hannover, Germany*

(Prof. Detlef W. Bahnemann Research Group)

- Working as a researcher in an R&D project including some of the associated administrative tasks (e.g., documentation of work results, and setting up and operating laboratory systems),
- Conducting research in the field of nanotechnology and photocatalysis for industrial and environmental purposes, such as manufacturing and developing nanomaterials that were used or coated in building materials.
- participation in the research work of the working group,
- Presenting scientific work in international conferences and in specialized journals as well,
- The implementation of exercises and lectures in the field of technical chemistry as well as material and Nanochemistry, participation in exams,
- Supervising the bachelor thesis at the Institute of technical chemistry.
- Gathering, arranging, and correcting research data to create representative graphs and charts highlighting results for presentations.
- Evaluating potential subject participants to assess suitability for planned studies.

Research design	Excellent	2017-05	Researcher, Teaching Assistant and PhD student
Literature reviews	Excellent	– 2022-01	<i>Institute of Technical Chemistry at Leibniz University Hannover, Hannover, Germany (Prof. Detlef W. Bahnemann Research Group)</i>
Research reporting	Excellent		<ul style="list-style-type: none"> • Designing and executing the Ph.D. research based on scientific approaches. • Conducting research in the field of nanotechnology and photocatalysis for industrial and environmental purposes, • Performing different experiments and analysis their data. • Writing research papers, reports, reviews and summaries regarding industrial material, photocatalysis, environmental chemistry, nanotechnology, analytical chemistry, and renewable energy. • Presenting scientific work in international conferences and in specialized journals as well, • Collaborating with the leadership team to identify relevant questions and determine the best scientific working methods. • Completing research projects by deadline and under the determined budget.
Experiment development	Excellent		
Experimental design	Excellent		
Method validation	Excellent		
Equipment management	Excellent		
Technical Writing	Excellent		
Grant writing	Excellent	2001-06 – 2017-01	Lab. Supervisor, Teaching and Research Assistant
Running experiments	Excellent		<i>Mutah University, Mutah, Al-Karak</i>
Safety and compliance	Excellent		<ul style="list-style-type: none"> • Teaching theoretical and practical parts of the following laboratories: <ol style="list-style-type: none"> General Chemistry (1) and (2). General and organic chemistry for medical students. General and organic chemistry for biology students. Analytical chemistry for chemistry students. Analytical chemistry for pharmacy students.
Lab safety	Excellent		Instrumental analysis.

Quality assurance
controls

Excellent

Deep-dive data analysis

Excellent

Research program
planning

Excellent

Data analysis

Excellent

Spectroscopy

Excellent

Good Laboratory
Practices (GLP)

Excellent

Languages

Arabic

Excellent

English

Very Good

Germany

Average

Software

Origin Lab software
expertise

- **Supervising the practical courses in the following Laboratories:**

- I. practical general chemistry.
- II. practical organic chemistry.
- III. practical inorganic chemistry.
- IV. practical analytical chemistry.
- V. practical instrumental analysis.
- VI. Practical systematic Identification of an organic compound.
- VII. practical general and organic chemistry for medical students.
- VIII. practical general and organic chemistry for biology students.

- Planned, modified, and executed research techniques, procedures, and tests.
- Worked both independently and collaboratively in a fast-paced laboratory environment.
- Attended seminars and symposiums to improve overall knowledge and understanding.

- **Research Assistant in many Funded Projects by Scientific Research Support Fund-Jordan :**

- I. Persistent Organic Pollutants and Pharmaceutical Residues in Selected Water Dams in Jordan. Group Leader: Dr. Mufeed Batarseh – Chemistry Department at Mutah University, 2010-2013.
- II. Organic Nanocrystalline Titanium Dioxide Dye-Sensitized Solar Cells. Group Leader: Dr. Hmoud Al Dmour – Physics Department at Mutah University, 2013-2015
- III. Development of Radio Frequency Probes for studying carbon nanotubes-based materials. Group Leader: Dr. Moath Al Trawneh – Physics Department at Mutah University, 2015-2017.
- IV. Jordan Biochar Research Initiative (JBRI). Group Leader: Dr. Osama Mohawesh - Department of Plant Production, Faculty of Agriculture at Mutah University, 2015-2017.

- **Trainer in Prince Faisal Center for Dead Sea, Environmental and Energy Research.**

Excellent

ChemDrow software
expertise

Excellent

ImageJ software
expertise

Excellent

1999-01 -
2001-06

Teacher

Ministry of Education, Al-Karak, Al-Karak

- Teaching Science and chemistry materials to secondary school students
- Planned and implemented integrated lessons to meet national standards.
- Evaluated and revised lesson plans and course content to achieve student-centered learning.
- Communicated frequently with parents, students, and administrators to provide feedback and discuss instructional strategies.
- Encouraged creative thinking and motivated students by addressing individual strengths and weaknesses based on standardized testing results.
- Designed dynamic lesson plans based on student interests to increase overall student GPA.

Education

2017-05

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2021-10

Ph.D.: Technical Chemistry

Institute of Technical Chemistry, Gottfried Wilhelm Leibniz University Hannover- Germany

Doctor of Natural Sciences, Industrial Environmental Chemistry, with grade "Magna Cum Laude", under supervision of apl. Prof. Dr. rer. nat. Detlef W. Bahnemann.

Thesis: Photocatalytic Transformation of Water Pollutants into Fuels

2010-09

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2013-08

Master of Science

Chemistry Department at Mutah University – Jordan

Master of Science, Analytical Environmental Chemistry, with an accumulative average of 92.88% and an Honor Degree, under the supervision of Prof. Mufeed Batarseh

Thesis: Indoor and outdoor pollution with Polycyclic Aromatic Hydrocarbons (PAHs) and heavy metals in Karak province / Jordan

1995-09

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1999-01

Bachelor of Science: Chemistry

*Chemistry Department at Mutah University - Jordan
with an accumulative average of 72.16%.*

Awards

<u>2021</u>	Job Contract as a Teaching and Research Assistant at Leibniz Universität Hannover, Germany.
<u>2020</u>	Completion Grant from Graduate Academy of Leibniz Universität Hannover for 9 Months to the Completion of a PhD Study at Leibniz Universität Hannover, Germany.
<u>2019</u>	Travel Grant to Participate at Conferences, Graduate Academy of Leibniz Universität Hannover.
<u>2019</u>	DAAD Grant to Participate at German-Russian Workshop at Sant-Petersburg University, Russia
<u>2018</u>	Mini Job Contract as a Teaching Assistant at Leibniz Universität Hannover, Germany.
<u>2017</u>	KAAD scholarship (3.5 years) for the Completion of a PhD Study at Leibniz Universität Hannover, Germany.
<u>2016</u>	Scientific Research Support Fund " Multi-residue analysis of soil and plant irrigated with King Talal Dam water-Jordan", Project No .
<u>2014</u>	DAAD Grant to Participate at DAAD – EXCEED Regional Workshop on "Wastewater Treatment and Reuse" Konya -Turkey at 03 – 06 June 2013.
2024	KAAD Jordanian partner committee

International Peer-Reviewer

Since 2021, I have served as an international peer-reviewer in several journals (publishers): **52 peer-review** records of 33 manuscripts documented in the Web of Science Researcher profile.

Training Courses

2023	ACS Reviewer Lab.
2021	ImageJ. For handling scientific images.
2020	Raman Spectroscopy: Operation Course
2018	How to write a scientific paper.
2013	Chromatography Techniques.
2013	ICP-MS training course

Publications

1. **Al-Madanat OY**, Popoola SA, Altarawneh RM, et al. **2025**. Comparative Studies of Regeneration and Single Batch Design for the Properties of Basic Blue-41 Removal Using Porous Clay and Porous Acid-Activated Heterostructures. *Water*, 17: 2.
2. Mousa, M.S., Al Dmour, H., Jaradat, E.K., **Al-Madanat, O.Y.**, MD, A., Zaidi, B., Alali, A.S. and Aravindan, V., **2024**. Studying the Effect of Transport Layers on ZrS₂/MEH-PPV Solar Cells: Using SCAPS-1D Software. *East European Journal of Physics*, (4), pp.419-426.
3. **Al-Madanat, O.Y.**; Popoola, S.A.; Al Dmour, H.; Al-Faze, R.; Kooli, F. **2024**. Na-Kenyaite as Efficient Basic Blue-41 Dye Removal: Synthesis and Regeneration Studies. *Water*, 16, 2056.
4. Al-Qaraleh, S.Y.; Al-Zereini, W.A.; Oran, S.A.; **Al-Madanat, O.Y.**; Al-Qtaitat, A.I.; Alahmad, A. **2024**. Enhanced Anti-Breast Cancer Activity of Green Synthesized Selenium Nanoparticles by Pegylation: Induction of Apoptosis and Potential Anticancer Drug Delivery System. *Advances in Natural Sciences: Nanoscience and Nanotechnology*, 15, 025006.
5. AlSalka, Y., **Al-Madanat, O.**, Hakki, A. **2023**. TiO₂-based photocatalytic hydrogen production: How to transfer it to an applicable approach? *Applied Catalysis A: General*, 662, 119287. **IF: 5.5, Q1**.
6. Abu Hajleh, M.N.; Al-limoun, M.; Al-Tarawneh, A.; Hijazin, T.J.; Alqaraleh, M.; Khleifat, K.; **Al-Madanat, O.Y.**; Qaisi, Y.A.; AlSarayreh, A.; Al-Samydai, A. **2023**. Synergistic Effects of AgNPs and Biochar: A Potential Combination for Combating Lung Cancer and Pathogenic Bacteria. *Molecules*, 28, 4757. **IF. 4.6, Q1**.
7. Curti, M., AlSalka, Y., **Al-Madanat, O.** and Bahnemann, D.W. **(2023)**. Isotopic Substitution to Unravel the Mechanisms of Photocatalytic Hydrogen Production. In *Photocatalytic Hydrogen Production for Sustainable Energy*, A. Puga (Ed.). **Wiley & Sons, Inc.**

8. Ramadan, W., AlSalka, Y., **Al-Madanat, O.**, Bahnemann, D.W. (2023). Synthesis of Magnetic Ferrite and TiO₂-Based Nanomaterials for Photocatalytic Water Splitting Applications. In: Synthesis and Applications of Nanomaterials and Nanocomposites: Composites Science and Technology. Ahmad, I. (eds), **Springer**.
9. Altarawneh, M., Aladailaha, M., & **Al-Madanat, O.** 2023. The Effect of Multi-Wall Carbon Nanotubes Addition on the Shielding Properties Against Gamma Radiation. **East European Journal of Physics**, (3), 524-530. **Q4**.
10. Ombaka, L., McGettrick, J., Oseghe, E., **Al-Madanat, O.**, genannt-Best, F., Msagati, T., Lloyd Davies, M., Bredow, T., Bahnemann, W. D. 2022. Photocatalytic H₂ production and degradation of aqueous 2-chlorophenol over B/N-graphene-coated Cu⁰/TiO₂: A DFT, experimental and mechanistic investigation. **Journal of Environmental Management**. 311,114822. . **IF: 8.7, Q1**.
11. Jiries, A., Al-Nasir, F., Hijazin, T., Mayyas, A., Al-Dmour, R., **Al-Madanat, O.** 2022. Polycyclic aromatic hydrocarbons in citrus fruit irrigated with fresh water under arid conditions: concentrations, sources and risk assessment. **Arabian Journal of Chemistry**, 15(9), 104027. **IF: 6, Q1**.
12. Alahmad, A.; Al-Zereini, W.A.; Hijazin, T.J.; **Al-Madanat, O.Y.**; Alghoraibi, I.; Al-Qaralleh, O.; Al-Qaraleh, S.; Feldhoff, A.; Walter, J.-G.; Scheper, T. 2022. Green Synthesis of Silver Nanoparticles Using Hypericum perforatum L. Aqueous Extract with the Evaluation of Its Antibacterial Activity against Clinical and Food Pathogens. **Pharmaceutics**, 14, 5, 1104. **IF: 5.4, Q1**.
13. Jiries, A., Al-Nasir, F., Hijazin, T., Mayyas, A., Al-Dmour, R., **Al-Madanat, O.** 2022. Polycyclic aromatic hydrocarbons in citrus fruit irrigated with fresh water under arid conditions: concentrations, sources and risk assessment. **Arabian Journal of Chemistry**, 15(9), 104027. **IF: 6, Q1**.
14. **Al-Madanat, O.**; Curti, M., Gühnemann, C., AlSalka, Y., Dillert, R., Bahnemann, D.W. 2021. TiO₂ photocatalysis: Impact of the platinum loading method on reductive and oxidative half-reactions. **Catalysis Today**, 380, pp. 3–15. **IF: 5.3, Q1**.

15. **Al-Madanat, O.**, AlSalka, Y., Ramadan, W., Bahnemann, D.W. **2021**. TiO₂ photocatalysis for the transformation of aromatic water pollutants into fuels. **Catalysts**. 11(3): 317. **IF: 3.9, Q1**.
16. **Al-Madanat, O.**, AlSalka, Y., Dillert, R., Bahnemann, D.W. **2021**. Photocatalytic H₂ production from naphthalene by various TiO₂ photocatalysts: Impact of Pt loading and formation of intermediates. **Catalysts**. 11(1): 107. **IF: 3.9, Q1**.
17. **Al-Madanat, O.**, Nunes, B., AlSalka, Y., Hakki, A., Curti, M., and Bahnemann, D.W. **2021**. Application of EPR Spectroscopy in TiO₂ and Nb₂O₅ Photocatalysis. **Catalysts**, 11, 1514. **IF: 3.9, Q1**.
18. **Al-Madanat, O.**, AlSalka, Y., Curti, M., Dillert R., Bahnemann, W. D. **2020**. Mechanistic Insights into hydrogen evolution by photocatalytic reforming of naphthalene. **ACS Catalysis**. 10: 7398–7412. **IF: 12.9, Q1**.
19. AlSalka, Y., **Al-Madanat, O.**, Hakki, A., and Bahnemann, D.W. **2021**. Boosting the H₂ Production Efficiency via Photocatalytic Organic Reforming: The Role of Additional Hole Scavenging. **Catalysts**. 11(12), 1423. **IF: 3.9, Q1**.
20. AlSalka, Y., **Al-Madanat, O.**, Curti, M., Hakki, A., Bahnemann, W. D. **2020**. Photocatalytic H₂ evolution from oxalic acid: Effect of co-catalysts and carbon dioxide radical anion on the surface charge transfer mechanisms. **ACS Applied Energy Materials**. 3, 7, 6678–6691. **IF: 6.4, Q1**.
21. Al-Nasir, F. M., Jiries, A. G., Al-Rabadi, G. J., Alu'datt, M. H., Tranchant, C. C., Al-Dalain, S. A., Alrabadi, N., **Madanat, O. Y.**, Al-Dmour, R. S. **2020**. Determination of pesticide residues in selected citrus fruits and vegetables cultivated in the Jordan Valley, **LWT - Food Science and Technology**. 123: 109005. **IF: 6, Q1**.
22. AlRabadi, G., Al-Nasir, F., Jiries, A., Al-Dmour, R., **Al-Madanat, O.**, Al-Dalain, S. **2019**. Polychlorinated biphenyls (PCBs) in citrus and vegetables in the Jordan Valley-jordan. **The Jordan Journal of Earth and Environmental Sciences (JEES)**. 10 (4): 247-251. **Q4**.

23. Altarawneh, M., Alharazneh, G., **Al-Madanat, O.** 2018. Dielectric properties of single wall carbon nanotubes-based gelatin phantoms, ***Journal of Advanced Dielectrics***. 08 (2): 1850010. **IF:3.1, Q2**
24. **Al-Madanat, O.**, Jiries, A., Batarseh, M., Al-Nasir, F. 2017. Indoor and Outdoor Pollution with Heavy Metals in Al-Karak City, Jordan. *J. Int. Environmental Application & Science*, 12(2): 131-139.

Oral Presentations

- **Al-Madanat**, O., Dillert, R., Bahnemann, W. D. "Hydrogen Production by Photocatalytic Reforming of Naphthalene ". 6th European Conference on Environmental Applications of Advanced Oxidation Processes, Portoroz, Slovenia, 26-30 June 2019.
- **Al-Madanat**, O., Dillert, R., Bahnemann, W. D. "Mechanistic Insights into Hydrogen Production by Pt/TiO₂ Anaerobic Photocatalytic Reforming of Aqueous Naphthalene". 7th German-Russian Workshop," Photoactive Nanocomposite Materials", National University of St. Petersburg, October 2019, St. Petersburg, Russia.
- **Al-Madanat**, O., Dillert, R., Bahnemann, W. D. "Photocatalytic H₂ Production from Naphthalene by Various TiO₂ Photocatalysts: Impact of Pt Loading and Formation of Intermediates ". 5th International Conference on Catalysis and Chemical Engineering. February 22-26, 2021-Virtual.
- **Al-Madanat**, O., Dillert, R., Bahnemann, W. D. "Hydrogen Production by Pt/TiO₂ Anaerobic Photocatalytic Reforming of Aqueous Naphthalene". 6th German-Russian Workshop," Photoactive Nanocomposite Materials", National University of St. Petersburg, October 2019, St. Petersburg, Russia.

Poster Presentation

- **Al-Madanat**, O., Dillert, R., Bahnemann, W. D. Impact of the Platinum-Loading Method on the Reductive and Oxidative Photocatalytic Half-Reactions over TiO₂. Inaugural CatalLight Young Scientist Symposium on Light-Driven Catalysis on November 24, 2020
- **Al-Madanat**, O. "Indoor and Outdoor Pollution with Polycyclic Aromatic Hydrocarbons (PAHs) and Heavy Metals in Karak Province / Jordan ". Conference: Humboldt Kolleg "Building International Networks for Enhancement of Research in Jordan " Princess Sumaya University Amman, April 3 - 5, 2014.

Conferences and workshops

- Global Virtual Meeting on Solar Fuels Conference, July 03, 2020.
- Nano day of the Laboratory of Nano and Quantum Engineering, Hannover University, 28 Sep. 2017.
- Nano day of the Laboratory of Nano and Quantum Engineering, Hannover University, 27 Sep. 2018.
- 6th European Conference on Environmental Applications of Advanced Oxidation Processes, Portoroz, Slovenia, 26-30 June 2019.
- Workshop for Young Scientist on April, 1 - 2, 2014 at The University of Jordan, Amman as part of the Humboldt Kolleg on "Building International Networks for Enhancement of Research in Jordan", Princess Sumaya University Amman April 2-5, 2014.
- Humboldt Kolleg "Building International Networks for Enhancement of Research in Jordan " Princess Sumaya University Amman, April 3 - 5, 2014.
- 7th German-Russian Workshop," Photoactive Nanocomposite Materials", National University of St. Petersburg, October 2019, St. Petersburg, Russia.
- 6th German-Russian Workshop," Photoactive Nanocomposite Materials", Hannover University, Sep 2018, Hannover, Germany.