

Curriculum Vitae (2022)

N. (Nader) Rahemi, PhD

Associate Professor of Chemical Engineering, Sahand University of Technology (2013-now)

Personal Information

- Name: Nader
- Surname: Rahemi
- Date of Birth: 24 March 1982
- Place of Birth: Tabriz, East Azerbaijan, Iran
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Language Skills

- English
- Persian
- Turkish

CEO and Member of the Board

- Vakonesh Yar Azarabadegan Industry Company

Books

1. Mass and energy balance for chemical, petroleum and polymer engineers, 2017
2. Principles of modern catalysts, 2017
3. Fundamentals and applications of heterogeneous catalysts, 2018

Education/Qualifications

- **Ph.D. of Chemical Engineering, Sahand University of Technology, Tabriz, Iran (2008-2013).**
 - Thesis title: CO₂-Reforming of Methane on Innovative Nano-Catalysts Prepared via Non-Thermal Plasma Technology
 - Supervisors: Prof. Dr. Mohammad Haghighi, Prof. Dr. Ali Akbar Babaluo

- **Visiting Researcher of Catalysis and Energy Research Centre, Eindhoven University of Technology, Eindhoven, The Netherlands (2011-2012).**
 - Thesis title: Investigation of Fischer Tropsch Fe/Mn Model Catalysts
 - Supervisors: Prof. Dr. J. W. (Hans) Niemantsverdriet, Assist. Prof. Dr. Peter Thune
- **Master of Chemical Engineering, Sahand University of Technology, Tabriz, Iran (2005-2007).**
 - Thesis title: Using Ultrasonic Energy for Preparation of Hydrodesulfurization Nano Catalyst
 - Supervisors: Prof. Dr. Mohammad Haghighi, Prof. Dr. Behzad Pourabbas
- **Bachelor of Chemical Engineering, Sahand University of Technology, Tabriz, Iran (2001-2005).**
 - Thesis title: Investigation of Ozone Concentration Effect on the VOC Abatement from Polluted Air over Silica Porous Bed
 - Supervisors: Prof. Dr. Anvar Khudiev, Assoc. Prof. Dr. Saeid Rajabzadeh

Research Interest

1. Nano Catalyst
2. CO₂ Valorization
3. Novel Energies in Catalyst Synthesis
4. Plasma Technology
5. Environmental Engineering
6. Natural Gas Conversions and Utilization (GTL Technology)
7. Desulfurization

Awards

1. Obtaining nanoscale licenses for desulfurization process catalysts from heavy fuels in 2021.
2. Superior Iranian PhD thesis in chemical engineering in 2014.
3. Distinguished student in BSc and MSc periods in Sahand University of Technology.
4. Best Chemical Engineering Students Paper Award, Shiraz University, Iran, 2008.
5. Brilliant student in Sahand University of Technology in both BSc and MSc degrees.

Teaching Experience

1. Development and Commercialization of New Industrial Catalysts: (2018-Date) MSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.
2. Surface Science: (2015-Date) MSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.
3. Advanced Reaction Engineering: (2014-Date) MSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.
4. Advanced Mathematics: (2013-Date) MSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.
5. Kinetics and Reactor Design: (2018-Date) MSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.

6. Fluid Mechanics: (2016-Date) MSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.
7. Mass and Energy Balance: (2014-Date) BSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.
8. Refinery Engineering Calculations: (2013-Date) BSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.
9. Chemical Engineering Software Workshop: (2016-Date) BSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.
10. Engineering Software Workshop: (2008-Date) BSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.
11. Organic Chemistry Laboratory: (2010-Date) MSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.
12. General Chemistry Laboratory: (2007-Date) MSc course, Chemical Engineering Faculty, Sahand University of Technology, Sahand New Town, Tabriz, Iran.

Research Projects

1. Concluded a memorandum of cooperation with Behran Oil Company for desulfurization of heavy fuels, (Executor) (2022-Date).
2. Investigation and evaluation of polyoxometalate nanocatalysts based on metal-organic framework and its functionalization using ionic liquid to study their synergistic effect on oxidative desulfurization of fuel oils, Science and Technology Vice-Presidency, ISTI (Executor) (2021-Date).
3. Monitoring and drawing a roadmap for the use of ionic liquid technology in natural gas sweetening, Research Institute of Petroleum Industry, RIPI (Executor) (2020-Date).
4. Oxidative desulfurization-adsorption of fuel oil by two-dimensional catalysts based on boron nitride under ultrasound, Iran National Science Foundation, INSF (Executor) (2020-Date).
5. Application of plasma technology in the removal of volatile organic compounds (BTX) using synthesized manganese oxide nanocatalysts from used batteries, Sahand University of Technology, SUT (Executor) (2018-2019).
6. Oxidative desulfurization of model fuels using visible light-sensitive cerium-based nano-photocatalytic coatings, Sahand University of Technology, SUT (Executor) (2018-2019).
7. Use of cold plasma to remove drug-resistant species in hospital wastewater with the help of zeolite-based nanocatalysts, Iran National Science Foundation, INSF (Executor) (2018-Date).
8. Synthesis and study of properties of porous mesoporous silica nanoparticles from whole grains and its modification with plasma technology for drug delivery, Iran National Science Foundation, INSF (Executor) (2019-Date).
9. Synthesis of floating photocatalysts using recycled beverage bottles to treat oil slicks using sunlight, Iran National Science Foundation, INSF (Executor) (2017-2019).
10. Design and fabrication of a process for production and purification of hydrogen used in fuel cells, Renewable Energy Organization of Iran, SANA, (Research Assistant) (2012-2014)

11. Evaluation and optimization of flare performance and combustion, National Iranian Gas Company, South Pars Gas Field, (Research Assistant) (2012-2014)
12. Carbon dioxide reforming of natural gas on innovative catalysts prepared via plasma technologies, National Iranian Oil Refining & Distribution Company, NIORDC (Research Assistant) (2008-2013).

Patents

1. Nader Rahemi, Somaiyeh Allahyari and Shayan Hoseini "Application of plasma technology in the removal of volatile organic compounds (BTX) using synthesized manganese oxide nanocatalysts from used batteries", Iran Patent 99800, 22 April 2019.
2. Somaiyeh Allahyari, Nader Rahemi and Hamid Kazemi "The Coating Device Consists of Two Methods of Immersion Coating and a Dr Blade for Coating Thin Films of Nanoparticles", Iran Patent 97433, 11 February 2018.
3. Mohammad Haghghi, Nader Rahemi and Samira Ashenaiean "The Production of NiMoW/FMWCNT Nanocatalyst with Sono-Coprecipitation Hybrid Method Modified by Plasma", Iran Patent 91988, 20 November 2016.
4. Mohammad Haghghi, Nader Rahemi and Ali Motevalian Seyedi "CZAZ (CuO-ZnO-Al₂O₃-ZrO₂) Nano-Catalysts Production by the Coprecipitation-Plasma Hybrid Method Used in Methanol Steam Reforming Process", Iran Patent 92116, 9 November 2016.
5. Mohammad Haghghi, Somaiyeh Allahyari and Nader Rahemi "Synthesis of Pt/CeO₂ Nano-Catalyst Using Ultrasound for Wet-Air Oxidation of Phenol", Iran Patent 58936, 16 May 2009.
6. Mohammad Haghghi, Somaiyeh Allahyari and Nader Rahemi "Catalytic Wet Air Oxidation of Phenolic Wastewaters Using Sonosynthesized Ru/CeO₂ Catalyst", Iran Patent 61918, 15 November 2009.
7. Mohammad Haghghi, Esmaeil Fatehifar, Zahra Abbasi and Nader Rahemi "Low Pressure Multi-propose Catalytic Oxidation Pilot for Removing Volatile Organic Compounds from Polluted Air", Iran Patent 59149, 23 May 2009.
8. Mohammad Haghghi, Esmaeil Fatehifar, Leila Karimnezhad and Nader Rahemi "Abatement of VOCs from Polluted Air Using Impregnated Carbon Active with ZnCl₂", Iran Patent 61919, 15 November 2009.
9. Mohammad Haghghi, Nader Rahemi and Zahra Abbasi "Low Pressure Pilot for Heterogeneous Catalyst Screening", Iran Patent 59977, 13 July 2009.
10. Mohammad Haghghi, Nader Rahemi and Somaiyeh Allahyari "Ultrasound Assisted CoMo/Al₂O₃ Nano-catalyst Synthesis for Elimination of Sulfur Compounds from Fossil Fuels", Iran Patent 61917, 15 November 2009.
11. Mohammad Haghghi, Nader Rahemi and Somaiyeh Allahyari "Synthesis of Cobalt-Molybdenum on Carbon Supported Catalyst by Using Ultrasonic Energy for Hydrodesulfurization Process", Iran Patent 58937, 16 May 2009.

ISI Journal Papers

1. Saflou, M., Allahyari, S., Rahemi, N. & Tasbihi, M. Oil spill degradation using floating magnetic simulated solar light-driven nano photocatalysts of Fe₃O₄-ZnO supported on lightweight minerals. *Journal of Environmental Chemical Engineering* **9**, 105268 (2021).
2. Porrhng, S. et al. Direct surface modification of mesoporous silica nanoparticles by DBD plasma as a green approach to prepare dual-responsive drug delivery system. *Journal of the Taiwan Institute of Chemical Engineers* **123**, 47-58 (2021).
3. Porrhng, S., Rahemi, N., Davaran, S., Mahdavi, M. & Hassanzadeh, B. Preparation and in-vitro evaluation of mesoporous biogenic silica nanoparticles obtained from rice and wheat husk as a biocompatible carrier for anti-cancer drug delivery. *European Journal of Pharmaceutical Sciences*, 105866 (2021).
4. Porrhng, S., Rahemi, N., Davaran, S., Mahdavi, M. & Hassanzadeh, B. Synthesis of temperature/pH dual-responsive mesoporous silica nanoparticles by surface modification and radical polymerization for anti-cancer drug delivery. *Colloids and Surfaces A: Physicochemical and Engineering Aspects* **623**, 126719 (2021).
5. Parvizi, N., Rahemi, N., Allahyari, S., Tasbihi, M. & Gharehabani, E. Synthesis of La_{0.8}Zn_{0.2}MnO₃ nanocatalysts for decomposition of VOCs in a DBD plasma reactor; Influence of sol-gel parameters. *Journal of the Taiwan Institute of Chemical Engineers* **123**, 141-152 (2021).
6. Feyzi, L., Rahemi, N. & Allahyari, S. Tetracycline degradation using combined system of dielectric barrier discharge air plasma and zeolites synthesized at different Na₂O/SiO₂ ratios. *Journal of Industrial and Engineering Chemistry* **104**, 555-570 (2021).
7. Farhadi, A.R.K., Rahemi, N., Allahyari, S. & Tasbihi, M. Metal-doped perovskite BiFeO₃/rGO nanocomposites towards the degradation of acetaminophen in aqueous phase using plasma-photocatalytic hybrid technology. *Journal of the Taiwan Institute of Chemical Engineers* **120**, 77-92 (2021).
8. Ettekali, N., Allahyari, S., Rahemi, N. & Abedini, F. One-pot oxidative-adsorptive desulfurization of model and real fuel using micro-mesoporous SiO₂ aerogel supported MoO₃. *Microporous and Mesoporous Materials* **326**(2021).
9. Abedini, F., Allahyari, S. & Rahemi, N. Oxidative desulfurization of dibenzothiophene and simultaneous adsorption of products on BiOBr-C₃N₄/MCM-41 visible-light-driven core-shell nano photocatalyst. *Applied Surface Science* **569**(2021).
10. Parvizi, N., Rahemi, N., Allahyari, S. & Tasbihi, M. Plasma-catalytic degradation of BTX over ternary perovskite-type La_{1-x}(Co, Zn, Mg, Ba)_xMnO₃ nanocatalysts. *Journal of Industrial and Engineering Chemistry* **84**, 167-178 (2020).
11. Najafidoust, A., Allahyari, S., Rahemi, N. & Tasbihi, M. Uniform coating of TiO₂ nanoparticles using biotemplates for photocatalytic wastewater treatment. *Ceramics International* **46**, 4707-4719 (2020).
12. Mohammadzadeh Yengejeh, S., Allahyari, S. & Rahemi, N. Efficient oxidative desulfurization of model fuel by visible-light-driven MoS₂-CeO₂/SiO₂-Al₂O₃ nano photocatalyst coating. *Process Safety and Environmental Protection* **143**, 25-35 (2020).
13. Joodi, A., Allahyari, S., Rahemi, N., Hoseini, S. & Tasbihi, M. ZnO-C₃N₄ solar light -driven nanophotocatalysts on floating recycled PET bottle as support for degradation of oil spill. *Ceramics International* **46**, 11328-11339 (2020).

14. Hoseini, S., Rahemi, N., Allahyari, S., Tasbihi, M. & Ghareshabani, E. Effect of hydrometallurgical process parameters on the Mn_2O_3 nano catalysts derived from spent batteries used in the plasma catalytic oxidation of BTX. *Advanced Powder Technology* **31**, 4187-4196 (2020).
15. Safari, E., Rahemi, N., Kahforoushan, D. & Allahyari, S. Copper adsorptive removal from aqueous solution by orange peel residue carbon nanoparticles synthesized by combustion method using response surface methodology. *Journal of Environmental Chemical Engineering* **7**(2019).
16. Rastegar Koochi, S., Allahyari, S., Kahforooshan, D., Rahemi, N. & Tasbihi, M. Natural Minerals as Support of Silicotungstic Acid for Photocatalytic Degradation of Methylene Blue in Wastewater. *Journal of Inorganic and Organometallic Polymers and Materials* **29**, 365-377 (2019).
17. Hoseini, S., Rahemi, N., Allahyari, S. & Tasbihi, M. Application of plasma technology in the removal of volatile organic compounds (BTX) using manganese oxide nano-catalysts synthesized from spent batteries. *Journal of Cleaner Production* **232**, 1134-1147 (2019).
18. Hakki, H.K., Allahyari, S., Rahemi, N. & Tasbihi, M. Surface properties, adherence, and photocatalytic activity of sol-gel dip-coated TiO_2 -ZnO films on glass plates. *Comptes Rendus Chimie* **22**, 393-405 (2019).
19. Ashenaieian, S., Haghghi, M. & Rahemi, N. Hybrid plasma-sono-coprecipitation dispersion of NiMo nanocatalyst over functionalized multiwall carbon nanotube used in hydrodesulfurization of thiophene. *Advanced Powder Technology* **30**, 502-512 (2019).
20. Hakki, H.K., Allahyari, S., Rahemi, N. & Tasbihi, M. The role of thermal annealing in controlling morphology, crystal structure and adherence of dip coated TiO_2 film on glass and its photocatalytic activity. *Materials Science in Semiconductor Processing* **85**, 24-32 (2018).
21. Baghbani Ghatar, S., Allahyari, S., Rahemi, N. & Tasbihi, M. Response Surface Methodology Optimization for Photodegradation of Methylene Blue in a ZnO Coated Flat Plate Continuous Photoreactor. *International Journal of Chemical Reactor Engineering* **16**(2018).
22. Rahemi, N. et al. Plasma-Assisted Dispersion of Bimetallic Ni-Co over Al_2O_3 -ZrO₂ for CO₂ Reforming of Methane: Influence of Voltage on Catalytic Properties. *Topics in Catalysis* **60**, 843-854 (2017).
23. Nejad, D.M., Rahemi, N. & Allahyari, S. Effect of tungsten loading on the physiochemical properties of nanocatalysts of Ni-Mo-W/carbon nanotubes for the hydrodesulfurization of thiophene. *Reaction Kinetics, Mechanisms and Catalysis* **120**, 279-294 (2017).
24. Motevalian Seyedi, A., Haghghi, M. & Rahemi, N. Significant influence of cutting-edge plasma technology on catalytic properties and performance of CuO-ZnO- Al_2O_3 -ZrO₂ nanocatalyst used in methanol steam reforming for fuel cell grade hydrogen production. *Ceramics International* **43**, 6201-6213 (2017).
25. Mohammad Gholipour, A., Rahemi, N., Allahyari, S. & Ghareshabani, E. Hybrid Plasma-Catalytic Oxidation of VOCs with NiMn/Montmorillonite: Plasma and Catalyst Considerations. *Topics in Catalysis* **60**, 934-943 (2017).
26. Bagherzadeh, S.B., Haghghi, M. & Rahemi, N. Novel oxalate gel coprecipitation synthesis of ZrO₂-CeO₂-promoted CuO-ZnO- Al_2O_3 nanocatalyst for fuel cell-grade hydrogen production from methanol: Influence of ceria-zirconia loading. *Energy Conversion and Management* **134**, 88-102 (2017).

27. Aghamohammadi, S., Haghghi, M., Maleki, M. & Rahemi, N. Sequential impregnation vs. sol-gel synthesized Ni/Al₂O₃-CeO₂ nanocatalyst for dry reforming of methane: Effect of synthesis method and support promotion. *Molecular Catalysis* **431**, 39-48 (2017).
28. Hassani Rad, S.J., Haghghi, M., Alizadeh Eslami, A., Rahmani, F. & Rahemi, N. Sol-gel vs. impregnation preparation of MgO and CeO₂ doped Ni/Al₂O₃ nanocatalysts used in dry reforming of methane: Effect of process conditions, synthesis method and support composition. *International Journal of Hydrogen Energy* **41**, 5335-5350 (2016).
29. Rahemi, N., Haghghi, M., Babaluo, A.A., Jafari, M.F. & Allahyari, S. CO₂ reforming of methane over Ni-Cu/Al₂O₃-ZrO₂ nanocatalyst: The influence of plasma treatment and process conditions on catalytic properties and performance. *Korean Journal of Chemical Engineering* **31**, 1553-1563 (2014).
30. Rahemi, N., Haghghi, M., Babaluo, A.A. & Fallah Jafari, M. Syngas production via CO₂ reforming of methane over plasma assisted synthesized Ni-Co/Al₂O₃-ZrO₂ nanocatalysts with different Ni-loadings. *International Journal of Energy Research* **38**, 765-779 (2014).
31. Rahemi, N., Haghghi, M., Babaluo, A.A., Allahyari, S. & Jafari, M.F. Syngas production from reforming of greenhouse gases CH₄/CO₂ over Ni-Cu/Al₂O₃ nanocatalyst: Impregnated vs. plasma-treated catalyst. *Energy Conversion and Management* **84**, 50-59 (2014).
32. Estifae, P., Haghghi, M., Babaluo, A.A., Rahemi, N. & Jafari, M.F. The beneficial use of non-thermal plasma in synthesis of Ni/Al₂O₃-MgO nanocatalyst used in hydrogen production from reforming of CH₄/CO₂ greenhouse gases. *Journal of Power Sources* **257**, 364-373 (2014).
33. Rahemi, N., Haghghi, M., Babaluo, A.A., Jafari, M.F. & Khorram, S. Non-thermal plasma assisted synthesis and physicochemical characterizations of Co and Cu doped Ni/Al₂O₃ nanocatalysts used for dry reforming of methane. *International Journal of Hydrogen Energy* **38**, 16048-16061 (2013).
34. Rahemi, N., Haghghi, M., Babaluo, A.A., Jafari, M.F. & Estifae, P. CO₂ reforming of CH₄ over CeO₂-doped Ni/Al₂O₃ nanocatalyst treated by non-thermal plasma. *Journal of Nanoscience and Nanotechnology* **13**, 4896-4908 (2013).
35. Rahemi, N., Haghghi, M., Babaluo, A.A., Jafari, M.F. & Estifae, P. Plasma assisted synthesis and physicochemical characterizations of Ni-Co/Al₂O₃ nanocatalyst used in dry reforming of methane. *Plasma Chemistry and Plasma Processing* **33**, 663-680 (2013).
36. Rahemi, N., Haghghi, M., Babaluo, A.A., Jafari, M.F. & Estifae, P. Synthesis and physicochemical characterizations of Ni/Al₂O₃-ZrO₂ nanocatalyst prepared via impregnation method and treated with non-thermal plasma for CO₂ reforming of CH₄. *Journal of Industrial and Engineering Chemistry* **19**, 1566-1576 (2013).
37. Rahemi, N., Haghghi, M., Babaluo, A.A., Jafari, M.F. & Allahyari, S. The effect of the calcination temperature on the physicochemical properties and catalytic activity in the dry reforming of methane over a Ni-Co/Al₂O₃-ZrO₂ nanocatalyst prepared by a hybrid impregnation-plasma method. *Catalysis Science and Technology* **3**, 3183-3191 (2013).
38. Rahemi, N., Haghghi, M., Akbar Babaluo, A., Fallah Jafari, M. & Khorram, S. Conversion of CH₄/CO₂ to syngas over Ni-Co/Al₂O₃-ZrO₂ nanocatalyst synthesized via plasma assisted co-impregnation method: Surface properties and catalytic performance. *Journal of Applied Physics* **114**(2013).

39. Abbasi, Z., Haghghi, M., Fatehifar, E. & Rahemi, N. Comparative synthesis and physicochemical characterization of CeO₂ nanopowder via redox reaction, precipitation and sol-gel methods used for total oxidation of toluene. *Asia-Pacific Journal of Chemical Engineering* **7**, 868-876 (2012).
40. Eslami, A.A., Haghghi, M., Rahemi, N. & Laheghi, S.N. Sol-Gel synthesis and characterization of Ni/Al₂O₃ nanocatalysts doped with Co and Cu. in *International Conference on Advances in Materials and Processing Technologies, AMPT2010* Vol. 1315 1297-1302 (Paris, 2010).

ISC Journal Papers

1. Porrhng, S., Rahemi, N., Davaran, S., Mahdavi, M. & Hassanzadeh, B. Synthesis of high biocompatible mesoporous silica nanocarriers with regular and uniform pore distribution for doxorubicin drug delivery. *Iranian Journal of Chemical Engineering* **20**, 31-42 (2021).
2. Feizi, L., Rahemi, N. & Allahyari, S. Investigation about tetracycline removal from aqueous solution by hybrid technology plasma water falling film-synthesized zeolite with different Na₂O/SiO₂ ratio. *Iranian Journal of Chemical Engineering* (2021).
3. Nejad, D.M., Rahemi, N. & Allahyari, S. Synthesis of Ni-Mo-W tri-metal nanocatalyst on alumina by ultrasound-co-precipitation method for hydrodesulfurization of thiophene. *Journal of Applied Chemistry* **54**, 153-166 (2020).
4. Allahyari, S., Rahemi, N., Mehrabi, M. & Tadayyon, S. Oxidative desulfurization of DBT using tri-metallic Ni-Mo-W nanocatalysts based on different natural zeolites: Mordenite, ferrierite, and clinoptilolite. *Petroleum Research* **29**, 89-98 (2019).
5. Sharifi, M., Haghghi, M., Rahemi, N. & Rahmani, F. A comparative synthesis and physicochemical characterizations of Ni/Al₂O₃ nanocatalyst via sequential impregnation and sol-gel methods used for dry reforming of methane. *Petroleum Research* (2017).
6. Sharifi, M., Haghghi, M., Alizadeh Eslami, A., Rahmani, F. & Rahemi, N. Synthesis and characterization of Ni-Cu/Al₂O₃-ZrO₂ nanocatalyst via sequential impregnation and sol-gel methods used in CH₄/CO₂ conversion to syngas. *Petroleum Research* (2016).
7. Sharifi, M., Haghghi, M., Rahmani, F. & Rahemi, N. Reforming of biogas over Co-and Cu-promoted Ni/Al₂O₃-ZrO₂ nanocatalyst synthesized via sequential impregnation method. *Journal of Renewable Energy and Environment* **1**, 54-65 (2014).