

Exponent®
Engineering & Scientific Consulting

Sahand Faraji, Ph.D., P.E.

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Professional Profile

Dr. Faraji has expertise in the areas of chemical engineering and industrial processing, hydrogen and clean energy production, nano-material synthesis, petrochemical and process safety, and experimental combustion processes. During his time at Exponent, Dr. Faraji has performed reliability, availability, and maintainability (RAM) studies for energy production and distribution plants, including utilities and the oil and gas industry. Dr. Faraji is experienced in performing economic feasibility analysis for high-pressure cryogenic carbon capture and storage systems and steam methane reforming hydrogen production plant. Dr. Faraji has extensively worked on multi-disciplinary projects related to the smoke and fire particulate damage assessment on buildings from both wildfires and structure fires. He has experience in analyzing large-scale industrial emissions comply with codes, standards, and regulations. Additionally, he has conducted multiple due diligence inspections to evaluate the operation and maintenance procedures for water treatment systems. He has also experience with the electrohydrodynamics-assisted de-emulsification procedure used in water treatment.

Dr. Faraji also has extensive experience in synthesizing materials from raw precursors as well as characterizing materials using both ex-situ (SEM, TEM, EDS, XRD, XRF, TGA, BET, XPS, etc.) and in-situ (DRIFTs, TPR, etc.) techniques. He is an expert in designing experimental setup and conducting reliability and failure analysis for a broad range of applications, including electronic packaging technologies with molded encapsulants, polymer-based activated carbon nanofibers, and catalysts performance in a catalysis reaction. His experience with computational modeling includes using commercial software for chemical kinetic modeling (CHEMKIN), process simulation (Aspen HYSYS), design of experiments (Minitab, JMP), and molecular simulation by DFT calculation (VASP).

Prior to joining Exponent, Dr. Faraji was a research assistant at the University of California, Irvine (UCI) to pursue his Ph.D. study. As part of the UCI Combustion Laboratory and the Advanced Power and Energy Program, he engaged in both fundamental and applied research to develop clean combustion technologies and mitigate environmental impacts. His dissertation focused on the impact of blending hydrogen with natural gas, as a fuel, on the NOx pollution reduction unit in stationary power applications. He studied the influence of zeolite material properties and flue gas conditions on the thermodynamics and reaction design of NOx reduction units. Dr. Faraji also developed new metal oxide-based nanomaterials for use as oxygen carriers in the chemical looping combustion technology. During his graduate studies, Dr. Faraji gained extensive experience in state-of-the-art experimental and computational characterization of combustion systems and emission control technologies using chemical reactions and transport phenomena.

Academic Credentials & Professional Honors

Ph.D., Chemical Engineering, University of California, Irvine, 2022

M.Sc., Chemical Engineering, Istanbul Technical University, Turkey, 2014

B.Sc., Chemical Engineering, University of Tabriz, Iran, 2012

Licenses and Certifications

Professional Engineer Chemical, California, #7237

40-Hour Hazardous Waste Operation and Emergency Response Certification (HAZWOPER)

Fire Investigation 1A (Cause and Origin), California Office of State Fire Marshal (CA)

Professional Affiliations

American Institute of Chemical Engineers (AIChE)

- Session Co-Chair for Advances in Ammonia as a Fuel/Hydrogen for Petrochemicals topical at the 2024 Spring Meeting, New Orleans, 24-28 March 2024.

Languages

Azeri-Turkish

Persian (Farsi)

Turkish

Publications

Kytömaa H, Wechsung A, Dimitrakopoulos G, Cook N, Jaimes D, Hur IY, Faraji S. Industry R&D Needs in Hydrogen Safety. Applications in Energy and Combustion Science. 2024 May 10:100271.

Faraji S, Sadri B, Hokmabad BV, Jadidoleslam N, Esmaeilzadeh E. Experimental study on the role of electrical conductivity in pulsating modes of electrospraying. Experimental Thermal and Fluid Science. 2017 Feb 1;81:327-35.

Faraji S, Yardim MF, Can DS, Sarac AS. Characterization of polyacrylonitrile, poly (acrylonitrile□co□vinyl acetate), and poly (acrylonitrile□co□itaconic acid) based activated carbon nanofibers. Journal of applied polymer science. 2017 Jan 10;134(2).

Hokmabad BV, Faraji S, Dizajyekan TG, Sadri B, Esmaeilzadeh E. Electric field-assisted manipulation of liquid jet and emanated droplets. International journal of multiphase flow. 2014 Oct 1;65:127-37.

Presentations

Kytomaa H, Wechsung A, Dimitrakopoulos G, Cook N, Jaimes D, Hur IY, Faraji S. Perspective Paper to Be Submitted to 40th International Symposium on Combustion, Milan, 21-26 July 2024.

Faraji S, Dee S, Enhancing Process Safety through Chatbots: Exploring Challenges and Potential, 2024 Spring Meeting and 20th Global Congress on Process Safety, New Orleans, 24-28 March 2024.

Faraji S, Horiuchi K, Padak B, Effect of Blending Hydrogen into Natural Gas on Selective Catalytic Reduction of NOx for Stationary Power Applications, November 2022 AIChE Annual Meeting.

Faraji S, Horiuchi K, Padak B, Effect of Blending Hydrogen into Natural Gas on Selective Catalytic Reduction of NOx for Stationary Power Applications, August 1st, 2022, Clearwater Clean Energy Conference

Faraji S, Celiktas B, Atakul H, Okutan H, Impact of O2, N2 and H2O on CO2 Separation System Based on Pressurizing in Oxy-fuel Combustion. Faraday Discussion 2016

Faraji S, Yardim MF, Sarac S, Suadiye D, TGA Study of Polymer Based Activated Carbon Nano-Fibers by Three Different Precursors. First National Carbon Conference-1. Ulusal Karbon Konferansı, 2015

Faraji S, Sadri B, Hokmabad BV, Esmaeilzadeh E, Jadidoleslam N, Electrospray characteristics of aqueous KCl solutions with various electrical conductivities. ICLASS 2012, 12th Triennial International Conference on Liquid Atomization and Spray Systems, Heidelberg, Germany, September 2-6, 2012

Hokmabad BV, Sadri B, Faraji S, Esmaielzadeh E, Gharraei R, Experimental investigation of electrospraying of water and KCl aqueous solutions in dielectric media, ILASS – Europe 2011, 24th European Conference on Liquid Atomization and Spray Systems, Estoril, Portugal, September 2011

Peer Reviews

Journal of Applied Polymer Science

Journal of Colloid and Interface Science

Journal of Energy and Power Engineering

Polymer Composite

International Journal of Experimental Spectroscopic Techniques

Oriental Journal of Chemistry

International Society of Offshore and Polar Engineers (ISOPE)