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Summary

Milad Molaee is a dedicated PhD student in Chemical Engineering with a robust background in the construction industry. He holds a Bachelor's degree in Polymer Engineering from Amirkabir University of Technology (Tehran Polytechnic) and a Master's degree in Chemical Engineering from Iran University of Science and Technology (IUST). Milad has extensive experience working with materials such as concrete, adhesives, grout, and detergents. He previously served as the Manager of the Research and Development Center at Dinokoll, where he led innovative projects and contributed significantly to the company's advancements. Currently, he focuses on the synthesis and production of various chemical raw materials, with a particular emphasis on hydrogel materials for the oil and gas industry. His PhD project is centered on the usage of hydrogels for corrosion protection, aiming to drive progress and innovation in this critical sector.

Education

Tehran Polytechnic *Sep 2013 - Jul 2018*

B.Sc. in Polymer Engineering

- Modeling of Low-Temperature Water-Gas Shift Reaction in Pd/Ag Membrane Reactor

Iran University of Science and Technology *Sep 2019 - Jul 2022*

M.Sc. in Chemical Engineering

- Molecular Simulation of Gas Adsorption on Single-Wall Carbon Nanotubes

Chemistry and Chemical Research Center of Iran *Sep 2022 - Present*

PhD in Chemical Engineering

- Self-Healing Nanocomposite Hydrogel Loaded with Corrosion Inhibitor for Protection of Q235 Carbon Steel

Work Experience

Dinokoll Inc. *Sep 2021 - Jun 2024 / Tehran*

R&D Manager

- At Dinokoll, I was employed for nearly three years, during which time I held the positions of both R&D unit manager and laboratory manager.

Chemistry & Chemical Engineering Research Center of Iran (CCERCI) *Sep 2022 - Present / Tehran*

Researcher

- At CCERCI, I have conducted research for nearly two years, with a focus on synthesizing and developing smart hydrogels for various applications. These applications include their use in anti-corrosion methods and materials within the oil and gas industry.

Skills

Scientific Polymer Chemistry | Polymer Characterization | Chemical Process Design | Reactor Design
Hydrogels | Supramolecular Networks | Molecular Simulation | Molecular Dynamics | Monte Carlo
Deep Learning | Artificial Neural Network | Design of experiments

Industrial Formulation of Industrial Chemicals | Design and Optimization of Chemical Process (Oil, Gas, Petrochamical)
Laboratory Data Analysis and Quality Control | R&D Project Managment and Execution
Technical Documentation and Industrial Reporting | Scale-up and Troubleshooting of Industrial Processes
Familiarity with Industrial Standards (ISIRI, ISO, ASTM) | Cross-functional Collaboration (Production, QC, Sales)

Computer Skills Aspen Plus | Hysys | COMSOL Multiphysics | AutoCAD | 3dsMax | SolidWorks | Matlab | OriginPro
Design Expert | Material Studio | Lammps | Python | C, C++ | MS Office | LaTeX

Languages ***Native:*** Persian ***Fluent:*** English (B2) ***Beginner:*** German (A1)

Certificates and Courses

Scientific Courses

- Introduction to Sustainability. Coursera, Instructor: University of Illinois Urbana-Champaign.
- Renewable Energy. Coursera, Instructor: University of Colorado Boulder.
- Sustainable Energy. EdX, Instructor: Massachusetts Institute of Technology.
- Design of Experiments. Coursera, Instructor: Arizona State University.
- Python Programming. Pytopia, Instructor: Ali Hejazi.
- Machine Learning. Pytopia, Instructor: Ali Hejazi.
- Multi-Objective Optimization with Python. Udemy, Instructor: Navid Shirazi.
- Protecting the World: Introducing Corrosion Science and Engineering. Instructor: University of Manchester.
- Chemical Hazards and Process Safety. Coursera, Instructor: University of California.

Engineering Courses

- AutoCAD Complete Course, Udemy, Instructor: Mike Freeman.
- The Complete Course of AutoCAD Plant 3D. Udemy, Instructor: The Tech Courses.
- Comsol Multiphysics: Complete Course 2024. Udemy, Instructor: Digital Courses.
- Engineering Project Management. Coursera, Instructor: Rice University.
- Solar Energy Basics. Coursera, Instructor: The State University of New York.
- Solar Energy System Design. Coursera, Instructor: The State University of New York.
- Material Processing. Coursera, Instructor: Georgia Institute of Technology.
- Physico/Chemical Processes of Environmental Engineering. EdX, Instructor: Purdue University

Chemical/Petroleum Engineering Courses

- Process/Chemical Engineering. Udemy, Instructors: Velocis Solution, Emil Salimov, and Foad Omar.
- Oil & Gas Industry Operations and Markets. Coursera, Instructor: Duke University.
- Utilities, Safety & Environmental Care in Oil & Gas Industry. Coursera, Instructor: L&T EduTech.
- The Complete Course of Aspen HYSYS. Udemy, Instructor: The Tech Courses.
- Aspen Plus V11 MasterClass: from Beginner to Advance User. Udemy, Instructor: WR Training Pro.
- Know Read Understand Piping & Instrumentation Diagrams (P&IDs). Udemy, Instructor: WR Training.

- Design of Industrial Piping Systems. Coursera, Instructor: L&T EduTech.
- Petroleum Engineering with AI Applications. Coursera, Instructor: L&T EduTech.

Projects

Scientific Projects

- Cellulose Derivatives: Synthesis and Characterization.
- Synthesis and Characterization of pH-sensitive Hydrogels.
- Synthesis and Characterization of Hydrogel-based Anticorrosion Coating.
- Monte Carlo Molecular Simulation of Coordination Polymerization (by C++).
- Monte Carlo Molecular Simulation of Gas adsorption on Multi-Wall Carbon Nanotube by Materials Studio.
- Modeling and Optimization of Water-Gas Shift Membrane Reactors by Matlab.
- Mathematical Modeling of Steam Reforming Membrane Reactors (Mathematica).
- NetHub: Deep Learning Package Design and Development (with Python).

Industrial Projects

- Synthesis and Characterization of Calcium Formate (Industrial-Scale).
- High-Tech Formulations for Concrete, Grout, and Tile Adhesive (Industrial-Scale).
- Detergent Formulation and Development (Industrial-Scale).

Scientific Articles

Journal Papers

- F. Bahmanzadgan, A. Ghaemi, M. Qasemnazhand, and M. Molaee, “Simulation of gas adsorption on single-walled carbon nanotubes”, Sci. Rep., vol. 15, no. 1, p. 15595, May 2025, doi:10.1038/s41598-025-99988-5.

- A. Ghaemi, A. Hemmati, M. Asadollahzadeh, and M. Molaee, “Hydrodynamic behavior of standard liquid-liquid systems in Oldshue–Rushton extraction column; RSM and ANN modeling”, Chem. Eng. Process. - Process Intensif., vol. 168, 2021, doi:10.1016/j.cep.2021.108559.

Conference Proceedings

- M. Molaee, E. Jalali, M. Moshtagh, H. Farahani,“Modeling of Water-Gas shift Membrane Reactor: Investigating the Effect of Design and Operational Parameters on Reactor Performance”, 4th International Conference on Oil, Gas, and Petrochimical, Tehran, Iran, 2017, url:civilica.com/doc/640789.

- M. Molaee, M. Moshtagh, F. Bateni,“Generation and Purification Modeling of Hydrogen by Water-Gas Shift Reaction in Low-Temperature for Fuel Cell Utilization”, 4th National Hydrogen and Fuel Cell Conference, Tehran, Iran, 2017, url:civilica.com/doc/641999.

- M. Moshtagh, M. Molaee, M. Moshtagh, “Modeling of low temperature gas-water shift reaction in packed bed membrane reactor”, 4th National Conference on Chemical, Petrochemical, and Nanotechnology, Tehran, Iran, 2016, url:civilica.com/doc/587258.

- M. Moshtagh, M. Molaee, M. Moshtagh, “Investigation of Parameters Affecting the Low-Temperature Water-Gas Shift Reaction in a Packed-Bed Membrane Reactor”, 2nd International Conference on Green Engineering and Technologies for a Sustainable Future, Tehtan, Iran, 2016, url:civilica.com/doc/596266.