



Nazgol is an experimental electrochemist and a material scientist with a diverse background and experiences in managing scientific and commercial projects and working with highly integrated teams. She is passionate about innovative energy solutions.

**Work experience**

Fall 2020 – present

**Postdoctoral Research Assistant**

Drexel University

Material Electrochemistry Lab

**Lithium-based Batteries:** Developed cathode materials for high energy and low-cost battery materials. Gained knowledge on lithium-based batteries chemical properties and techniques needed for electrochemical performance assessment.

- Synthesizing transition metal (Molybdenum and Titanium) oxide and carbon-based layered heterostructures for high-performance electrodes in energy storage systems using aqueous sol-gel, hydrothermal, and annealing techniques. This project is a collaboration with Stony Brook University and Brookhaven National Lab.
- Electrocatalytic cathodes based on transition metal (Nickel, and Cobalt) nanoparticles supported on carbon. Chronopotentiometry data processed using Python scripts.
- Electrocatalytic cathodes derived from metal-organic frameworks.

Fall 2015 - Spring 2020

**Graduate Research Assistant**

VCU

Dr. El-Kaderi's research Lab

**Fuel Cell:** Lead research and development of electrocatalysts for energy conversion applications and characterize the composition, crystal structure and microstructure of cathode materials. Material synthesis techniques include thermolysis, carbonization, chemical activation, polymerization, nanoparticle synthesis, deposition.

**Heterogeneous Catalysts - Cross-Coupling:** Developed bimetallic NPs deposited on commercially available supports to be used as catalysts for Cross-Coupling reactions. This project was a collaboration between Virginia Commonwealth University, University of South Carolina and industry partners.

**Gas adsorption and separation:** Worked on the synthesis and development of nitrogen-doped porous carbon structures for gas adsorption and separation.

**Metal ions detection and separation:** worked on the characterization and development of a fluorescent nanocomposite for detection of metal ions, and collaborated on the development of a novel self-floating polymer for adsorption of rare-earth metal ions.

Fall 2015 - Spring 2020

**Teaching Assistant**

VCU

Chemistry Department

Effectively conveyed complex ideas to over 50 students/semester and collaborated with other professors and equipment suppliers.

- Organic chemistry labs
- General chemistry labs and recitations

Fall 2017 - Spring 2020

**Chemical Safety Officer**, Virginia Commonwealth University, Richmond, VA

Summer 2014

**Intern**, Grenova

Richmond, VA

Product Innovation & Engineering intern. I worked on part design and development, market research and product assembly.

Summer 2009 & 2012

**Intern**, Aria Kian

Gazvin

Aria Kian manufactures car components. I worked in the chromatophoresis coating laboratory, and learned about the electrodeposition process. I also worked for the Quality Control division as an assistant; gained experience in design of experiments (DoEs), failure mode analysis, ISO 18000, and ISO 14000

## Education

Fall 2015 - Spring 2020

**Ph.D. in Nanoscience**

VCU, Richmond, VA

Dissertation: Synthesis of Supported Metal Nanoparticles on High Surface Area Supports for Application in Energy Conversion and Heterogeneous Catalysis. Advisor: Dr. Hani El-Kaderi

Fall 2013 - Fall 2014

**Master of Product Innovation**

da Vinci Center, VCU

Capstone Project: Developing an all-in-one food processing device; 3D design and printing, milestone management, prototype development, primary and secondary market research, and marketing plan development.

Advisor: Dr. Frank Franzak

Fall 2008 - Summer 2012

**B.Sc. in Polymer Engineering**

SRBIAU Tehran

Advisor: Dr. Milad Mehranpour

## Skills

### ❖ *Characterization Techniques:*

- Potentiostat – Electrochemical Analysis
- X-ray diffraction Spectroscopy
- Transmission Electron Microscopy
- Scanning Electron Microscopy
- Energy-dispersive X-ray Spectroscopy
- X-ray photoelectron Spectroscopy
- Raman Spectroscopy
- Fourier-Transform Infrared Spectroscopy

- Glove box
- Nuclear Magnetic Resonance Spectroscopy
- UV-Vis Spectroscopy
- Atomic Layer Deposition
- Inductive Coupled Plasma
- Gas chromatography – mass spectroscopy
- Physisorption and Chemisorption Analysis
- Thermogravimetric Analysis

### ❖ *Programming Language:*

- Python
- ❖ *Software:*
- Origin Pro
- ChemDraw Suite
- CATIA
- ❖ *Language:*
- English – Full proficiency
- German – Elementary proficiency
- Farsi – Native

## Publications

- Norouzi, N.; Choudhury, F. A.; El-Kaderi, H. M.; Iron Phosphide Doped Porous Carbon as an Efficient Electrocatalyst for Oxygen Reduction Reaction. *ACS Appl. Energy Mater.* **2020** 3 (3), 2537–2546.
- Abdelkader, A. A.; Norouzi, N.; Rodene, D. D.; Alzharani, A.; Gupta, R. B.; El-Kaderi, H. M.; Electrocatalytic Cathodes Based on Cobalt Nanoparticles Supported on Nitrogen–Doped Porous Carbon for Advanced Lithium–Sulfur Batteries. *ACS Energy Fuels.* **2020** 34 (10) 13038-13047.
- Abdelkader A. A.; Rodene, D. D.; Norouzi, N.; Alzharani, A.; Weeraratne K. S.; Gupta, R. B.; El-Kaderi, H. M. Multifunctional Electrocatalytic Cathodes Derived from Metal Organic Frameworks for Advanced Lithium-Sulfur Batteries. *Chem. - A Eur. J.* **2020** 26 (61), 13896-13903.
- Norouzi, N.; Das, M.K.; Richard, A. J.; Mohammed, A. A.; El-Kaderi, H. M.; El-Shall, M. S.; Heterogeneous Catalysis by Ultra-small Bimetallic Nanoparticles Surpassing Homogeneous Catalysis for Carbon-Carbon Bond Forming Reactions. *Nanoscale* **2020** 12 (37), 19191-19202.
- Mir, N.; Karimi, P.; Castano, C. E; Norouzi, N.; Jessika V Rojas, J. V.; Mohammadi, R. Functionalizing Fe<sub>3</sub>O<sub>4</sub>@SiO<sub>2</sub> with a Novel Mercaptobenzothiazole Derivative: Application to Trace Fluorometric and Colorimetric Detection of Fe<sup>3+</sup> in Water. *Appl. Surf. Sci.* **2019** 487, 876-888.
- Abdelmoaty, Y. H.; Tessema, T. D.; Norouzi, N.; El-Kadri, O. M.; Turner, J. B. M. G.; El-Kaderi, H. M. Effective Approach for Increasing the Heteroatom Doping Levels of Porous Carbons for Superior CO<sub>2</sub> Capture and Separation Performance. *ACS Appl. Mater. Interfaces* **2017**, 9 (41), 35802–35810.
- Mir, N.; Castano, C. E; Jessika V Rojas, J. V.; Norouzi, N.; Esmaeili, Amir; Mohammadi, R; Self-separation of the adsorbent after recovery of rare-earth metals: Designing a novel non-wettable polymer. *J. Seppur.* **2021** 256 118152.

## Presentations

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- Norouzi, N.; Choudhury, F. A.; El-Kaderi, H. M.; Iron Phosphide Doped-porous Carbon as an Efficient Electrocatalyst for Oxygen Reduction Reaction. Poster presentation delivered at the International Symposium on Clusters and Nanomaterials (ISCAN), Richmond, VA, November 2019.
- Norouzi, N.; Choudhury, F.A.; El-Kaderi, H. M.; Phosphorus and Iron Doped-Porous Carbon as an Efficient Electrocatalyst for Oxygen Reduction Reaction in Alkaline Medium. Oral presentation delivered at the 236<sup>th</sup> the ElectroChemical Society, Atlanta, GA, October 2019.
- Norouzi, N.; Das, M.K.; El-Shall, M. S.; El-Kaderi, H. M.; Ultrasmall Bimetallic Catalysts for Selective Hydrogenation of Alkynes. Oral and Poster Presentation delivered at the biannual CeRCaS Meeting (Center for Rational Catalyst Synthesis). Richmond, VA, May 2019.
- Norouzi, N.; Das, M.K.; Alomainy, O.; Mohammed, A. A.; El-Shall, M. S.; El-Kaderi, H. M.; Various Approaches to the Synthesis of Homogeneously Alloyed, Ultra-small Copper-Palladium Nanoparticles for Catalytic Applications. Oral and Poster Presentation delivered at the biannual CeRCaS Meeting (Center for Rational Catalyst Synthesis). Columbia, SC, December 2018.
- Norouzi, N.; El-Kaderi, H. M.; Facile one-step synthesis of nanoporous nitrogen-doped carbon electrocatalyst: A study of porosity, elemental composition, and morphology towards a highly efficient renewable energy system. Poster Presentation delivered at the 69<sup>th</sup>, SERMACS, Charlotte, NC, November 2017.

## Honors and Awards

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- 2nd place award, at International Symposium on Clusters and Nanomaterials (ISCAN) poster presentation [Fall 2019]
- Virginia Commonwealth University, Graduate School Travel Grant [ Fall 2019]
- 1st place winner, Venture Creation Competition [ April 2015]
  - 4000\$ first place cash prize
  - 3000\$ in kind legal services with Cooley LLP – Submission of a Provisional Patent
- Virginia Commonwealth University Innovation Gateway - Entrepreneurial Award [May 2015]
  - 600\$ for LLC submission and operational agreement
- Honorable mention at the State of the University [ January 2015]

## Workshops

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- Virginia commonwealth Summer Leadership Series [ Summer 2018 ]
- Virginia Energy Storage and Conversion Workshop [ June 2019 ]

## Outreach activities

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- Member of American Chemical Society (ACS), 2017 – Present
- Member of Electrochemical Society (ECS), 2018 – Present
- Volunteer at Virginia Science Museum – Earth Week 2018
- Treasurer at Persian Culture Club, Virginia Commonwealth University, 2014 – 2016
- Reviewer for the following journals:
  - Applied Surface Science
  - ACS Industrial & Engineering Chemistry Research
  - Journal of the Electrochemical Society
  - Chemical Engineering Journal
  - Journal of Materials Research and Technology
  - Journal of Alloy and Compounds
  - Separation and Purification Technology