

Armin Vahid Mohammadi

Research Assistant Professor

A. J. Drexel Nanomaterials Institute, Drexel University

Ph.D. in Materials Engineering

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Education

- Aug. 2015 - Aug. 2019 **Ph.D.** in Materials Engineering,
Auburn University, Auburn, AL, USA
- Aug. 2013 - Aug. 2015 **M.Sc.** in Materials Science and Engineering,
Florida International University, Miami, FL, USA
- Sep. 2010 - Sep. 2012 **M.Sc.** in Materials Science and Engineering,
Sharif University of Technology, Tehran, Iran
- Sep. 2006 - Sep. 2010 **B.Sc.** in Materials Science and Engineering,
Sharif University of Technology, Tehran, Iran

Professional and Research Experiences

07/2020 – Present **Research Assistant Professor**

A. J. Drexel Nanomaterials Institute, Drexel University, Philadelphia, PA, USA

Role: Conducting research on nanomaterials for electrochemical applications under the supervision of Prof. Yury Gogotsi

09/2019 – 06/2020 **Postdoctoral Research Associate**

Innovation Partnership Building (TechPark), University of Connecticut, CT, USA

Role: Acted as the lead researcher for 2D nanomaterials and battery projects of the TechPark center and created connections and interest for industry partners and potential investors

08/2015 – 08/2019 **Doctoral Student and Graduate Research Assistant**

Department of Materials Engineering, Auburn University, Auburn, AL, USA

- Developed solution processing and self-assembly techniques for synthesis of 2D materials (MXenes and TMOs)
- Conducted Li-ion battery and supercapacitor electrode and cell assembly and testing in organic and aqueous electrolytes
- Synthesized and prepared organic and ionic-liquid based electrolytes for batteries
- Performed electrochemical analyses on batteries and supercapacitors

08/2013 – 08/2015 **Teaching and Research Assistant**

Department of Mechanical and Materials Engineering, Florida International University, Miami, FL, USA

- Synthesis of high temperature ceramics and fabrication of intermediate temperature solid oxide fuel cells (SOFCs)

2007 – 2013 **R&D and Car Technical Expert**

IKCO Car Company, Tehran, Iran

- Auto-Journalist; performed R&D, test drive, and market evaluation of potential products and new cars

Selected Publications (Full list available at [Google Scholar](#), Citations: 579, h-index: 12)

1. **A. Vahid Mohammadi**, M. Mojtabavi, N. M. Caffrey, M. Wanunu, and M. Beidaghi, “Assembling 2D MXenes into Highly Stable Pseudocapacitive Electrodes with High Power and Energy Densities”, **Advanced Materials**, 31, 1806931, **2019**. * *Featured on the inside back cover of Advanced Materials.*
2. **A. Vahid Mohammadi**, A. Hadjikhani, S. Shahbazmohamadi, and M. Beidaghi, “2D Vanadium Carbide (MXene) as a High-Capacity Cathode Material for Rechargeable Aluminum Batteries”, **ACS Nano**, 11(11), 11135-11144, **2017**.
3. **A. Vahid Mohammadi**, J. Moncada, H. Chen, E. Kayali, J. Orangi, C. A. Carrero, and M. Beidaghi, “Thick and Freestanding MXene/PANI Pseudocapacitive Electrodes with Ultrahigh Specific Capacitance”, **Journal of Materials Chemistry A**, 6 (44), 22123-22133, **2018**.
4. W. Tian*, **A. Vahid Mohammadi***, Z. Wang, L. Ouyang, M. Beidaghi, and M. M. Hamed, “Layer-by-Layer Assembly of Pillared MXene Multilayers”, **Nature Communications**, 10 (1), 2558, **2019**. (*equal contribution)
5. W. Tian*, **A. Vahid Mohammadi***, M. S. Reid, Z. Wang, L. Ouyang*, J. Erlandsson, T. Pettersson, L. Wågberg, M. Beidaghi, M. M. Hamed, “Multifunctional Nanocomposites with High Strength and Capacitance Using 2D MXene and 1D Nanocellulose”, **Advanced Materials**, 1902977, **2019**. (*equal contribution) – * *Featured on the front cover of Advanced Materials and highlighted in Nature Review Materials (<https://doi.org/10.1038/s41578-019-0143-y>).*

6. M. Mojtabavi*, **A. VahidMohammadi***, W. Liang, M. Beidaghi, and M. Wanunu, “Single-Molecule Sensing Using Nanopores in Two-Dimensional MXenes Membranes”, *ACS Nano*, 13 (3), 3042–3053, **2019**. (* equal contribution)
7. E. Lee, **A. VahidMohammadi**, B. C. Prorok, Y. S. Yoon, M. Beidaghi, and D. J. Kim, “Room Temperature Gas Sensing of Two-Dimensional Titanium Carbide (MXene)”, *ACS Applied Materials & Interfaces*, 9 (42), 37184-37190, **2017**.
8. **A. VahidMohammadi** and Z. Cheng, “Fundamentals of Synthesis, Sintering Issues, and Chemical Stability of BZCYYb Proton Conducting Electrolyte for SOFCs”, *Journal of The Electrochemical Society*, 162 (8), F803-F811, **2015**.
9. B. Sapkota, W. Liang, **A. VahidMohammadi**, R. Karnik, A. Noy, M. Wanunu, “High Permeability Sub-Nanometre Sieve Composite MoS₂ Membranes”, *Nature Communication*, **2020**.
10. R. Thakur, **A. VahidMohammadi**, J. Smith, J. Moncada, M. Beidaghi, C. A. Carrero, “Insights into the Genesis of a Selective and Coke Resistant Catalyst for the Dry Reforming of Methane”, *ACS Catalysis*, 10 (9), 5124-5134, **2020**.
11. E. Lee*, **A. VahidMohammadi***, Y. S. Yoon, M. Beidaghi, and D-J Kim, “Two-Dimensional V₂CT_x MXene Gas Sensors with Ultrahigh Sensitivity Toward Non-Polar Gases”, *ACS Sensors*, 4, 1603-1611, **2019**. (*equal contribution)
12. E. Kayali, **A. VahidMohammadi**, J. Orangi, and M. Beidaghi, “Controlling the Dimensions of 2D MXenes for Ultrahigh-Rate Pseudocapacitive Energy Storage”, *ACS Applied Materials & Interfaces*, 10 (31), 25949-25954, **2018**.
13. R. Thakur, **A. VahidMohammadi**, J. Moncada, R. Adams, M. Chi, B. Tatarchuk, M. Beidaghi, C. A. Carrero, “Insights into the Thermal and Chemical Stability of Multilayered V₂CT_x MXene”, *Nanoscale*, 11, 10716-10726, **2019**.

Patents

- M. Beidaghi and **A. VahidMohammadi**, “Electrochemical Systems Comprising MXenes and Max Phase Compositions and Methods of Using the Same”, **US Patent**, US Patent No.: US10756345. Issue Date: August 25, **2020**.
- M. Wanunu, M. Mojtabavi, **A. VahidMohammadi**, and M. Beidaghi, “MXene Nanopore Sequencer of Biopolymers”, **US Non-Provisional Patent**, Application No. PCT/US2020/016456, **2020**.

Technical Skills and Expertise

Research Techniques and Experiences

Electrochemistry (5+ years) | Inorganic synthesis of nanomaterials (7+ years) | Wet chemistry (4+ years) | Li-ion battery cell assembly and testing (5+ years) | Supercapacitor cell assembly and testing (5+ years) | High-temperature synthesis of ceramics and carbides/oxides (6+ years)

Computer Software/Programming

MATLAB Programming | AutoCAD | Autodesk 3ds MAX | Adobe Photoshop | Adobe Premier and After Effects | MS-Office (Word, Excel, and Power Point) | EC-Lab software | Origin Lab | C++ (intermediate)

Device & Instrument Skills

Potentiostat (Bio-Logic VMP3 or similar potentiostats) | **Scanning Electron Microscopy (SEM)** | **Energy Dispersive X-ray Spectroscopy (EDS)** | **X-ray Diffractometer (XRD)** | **Atomic Force Microscopy (AFM)** | **Thermogravimetric Analysis (TGA/DSC)** | **Cleanroom Experience** | **Photolithography** (Spin Coater, Mask Maker, and Mask Aligner) | **Sputtering systems**

Honors and Awards

- 2019** **JEOL USA’s 2019 Grand Prize Winner for Scanning Electron Microscopy (SEM)**
Auburn University’s Outstanding Doctoral Student, 2018-2019 academic year, Auburn University
Auburn University’s Outstanding International Student, 2018-2019 academic year, Auburn University
Second Place Winner, Annual Elements of Mechanical Engineering Conference, Auburn University
Second Place Winner, 2019 MRS Spring Meeting “**Science as Art**” competition
Winner of JEOL USA’s March 2019 Scanning Electron Microscopy (SEM) Image Contest
- 2018** **First Place Winner**, 2018 MRS Fall Meeting “**Science as Art**” competition
Alabama EPSCoR-GRSP Round 13, Research Proposal Funding (awarded \$25K) and PhD Fellowship
Winner of JEOL USA’s October 2018 Scanning Electron Microscopy (SEM) Image Contest
Best Poster Award of Materials Engineering, Graduate Engineering Research Showcase, Auburn University
- 2017** **JEOL USA’s 2017 Grand Prize Winner for Scanning Electron Microscopy (SEM)**
Honorable Award, 2017 MRS Fall Meeting “**SciVid** (Science in Videos)” Competition, November 2017
Best Poster Award of Materials Engineering, Graduate Engineering Research Showcase, Auburn University
Alabama EPSCoR-GRSP Round 12, Research Proposal Funding (awarded \$25K) and PhD Fellowship
Winner of JEOL USA’s March 2017 Scanning Electron Microscopy (SEM) Image Contest
- 2016** **First Place Winner**, 2016 MRS Fall Meeting “**Science as Art**” international competition

Alabama EPSCoR-GRSP Round 11, [Research Proposal Funding \(awarded \\$22K\)](#) and PhD Fellowship
Woltoz Departmental Ph.D. Fellowship, Auburn University

Research Highlights and Media Coverage

- **2019 MRS Science as Art Award: MXene Yoda**
Featured on famous and leading nano website: Nanowerk.com ([Link](#)) | Auburn University coverage ([Link](#)) | Microscopy and Analysis website coverage ([Link](#))
- **2019 Interview with Materials Research Society (MRS) Blog, Materials Connect**
The interview highlights my research and my approach toward artistic representation of scientific results ([Link](#))
- **2018 MRS Science as Art First Place Award**
Auburn University coverage ([Link](#)) | Auburn University 2019 coverage on 2018 MRS and 2017 JEOL USA award ([Link](#))
- **2017 JEOL USA Grand Prize Award for SEM**
JEOL USA's interview and award story coverage ([Link](#))
- **2017 MRS Science in Videos (SciVid) Honorable Award**
Materials Research Society (MRS) story coverage ([Link](#)) | Cambridge.org and MRS Bulletin coverage ([Link](#)) | Link to the winning video on YouTube with more than 2K views ([Link](#))
- **2017 Round 11 Graduate Research Scholars Program (GRSP) Featured Scholars**
Alabama EPSCoR coverage ([Link](#))
- **2016 MRS Science as Art First Place Award**
Inside Science website coverage ([Link](#)) | MRS Materials 360 newsletter ([Link](#)) | Auburn-Opelika news coverage, aonow.com ([Link](#)) | Auburn University coverage ([Link](#)) | Auburn's video coverage on YouTube ([Link](#)) | Issuu.com coverage ([Link](#)) | Freethought blog coverage ([Link](#))