Danzhen Zhang

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Education

PhD: Drexel Nanomaterials Institute, Drexel University, Philadelphia
GPA: 3.98/4.00 Sept 2019-Present

Bachelor: School of Materials Science and Engineering(SMSE), Tsinghua University(THU), Beijing
GPA: 3.70/4.00 Rank: 15/122 Aug 2015-June 2019

Research Experiences

Graduate Research Assistant, Drexel University, Advisor: Prof. Yury Gogotsi Sept 2019-present
Projects:

- In situ UV-Vis spectroscopy for monitoring redox processes and distinguishing faradaic or non-faradaic reactions
- Dynamically tuning optical responses (absorption/reflection) from UV-Vis to infrared (IR), microwaves ranges by in situ electrochemical method
- Infrared emissivity/reflectance of various MXenes and demonstrated MXenes capability in IR identification and thermal radiative cooling/warming
- In situ impedance measurement for active electrode materials

Undergraduate Research Assistant, University of Pennsylvania, Advisor: Prof. A.T. Charlie Johnson July 2018-Sept 2018
Projects:

- Rapid chemical vapor deposition (CVD) growth of transition metal dichalcogenides (TMDs) for large-area electronics

Undergraduate Research Assistant, Tsinghua University, advisor: Prof. Hongwei Zhu June 2016-May 2019
Projects:

- Electrospinning graphene-oxide/polyacrylonitrile (PAN) composites for high $PM_{2.5}$ removal efficiency and low pressure drop
- Electrospinning MoS_2/PAN nanofibers for hydrogen evolution reaction with lower overpotential

Key Publications and Manuscripts

1. **D. Zhang**[#], K. Matthews[#], *et al.* Switchable multispectral optics with reversible tunability from visible to microwave wavelengths. *In preparation*
2. Y. Zhang[#], **D. Zhang**[#], *et al.* Physically confined MXene electrode for pressure sensor. *In preparation*.
3. A.A. Shamsabadi[#], H. Fang[#], **D. Zhang**, *et al.* The Evolution of MXenes Conductivity and Optical Properties Upon Heating in Air. Small Methods, 2300568, (2023)
4. **D. Zhang**[#]**,** R.Wang[#]**,** *et al.* In situ monitoring redox processes in energy storage using UV-Vis spectroscopy. ***Nature Energy***, 8, 567-576, (2023). [Selected to publish a **Research Briefing**: UV–vis spectroscopy for monitoring oxidation state changes during electrochemical energy storage. ***Nature Energy*** 8, 565-566, (2023)]
5. M. Han[#], **D. Zhang**[#], *et al*. Versatility of infrared properties of MXenes. ***Materials Today***, 64, 31-39, (2023)
6. M. Han[#], **D. Zhang**[#], *et al*. Electrochemically modulated interaction of MXenes with microwaves. ***Nature Nanotechnology***, 18, 373-379, (2023)
7. A. Aydinli, X. Wang, C. McHugh, **D. Zhang**, *et al*. $Ti_3C_2T_x$ supercapacitors with a hexagonal boron nitride separator manufactured by spray coating. ***Graphene and 2D Materials***, 7, 81-89, (2022)
8. A. Hazan, B. Ratzker, **D. Zhang**, *et al*. MXene-Nanoflakes-Enabled All-Optical Nonlinear Activation Function for On-Chip Photonic Deep Neural Networks. ***Advanced Materials***, e2210216, (2023)
9. H. Zhou[#], S. J. Han[#], H. D. Lee[#], **D. Zhang** *et al*. Overcoming the Limitations of MXene Electrodes for Solution-Processed Optoelectronic Devices. ***Advanced Materials*** 34, e2206377, (2022)
10. **D. Zhang**, D. Shah, A. Boltasseva & Y. Gogotsi. MXenes for Photonics. ***ACS Photonics***, 9, 1108-1116, (2022)
11. **D. Zhang**, C. Wen, J. B. McClimon *et al.* Rapid Growth of Monolayer $MoSe_2$ Films for Large-Area Electronics. ***Advanced Electron Materials***, 7, (2021)
12. X. Wang, …, **D. Zhang** *et al.* Titanium Carbide MXene Shows an Electrochemical Anomaly in Water-in-Salt Electrolytes. ***ACS Nano***, 15, 15274-15284, (2021)
13. J. Li, **D. Zhang**, X. Jiang *et al.* Nest-like multilevel structured graphene oxide-on-polyacrylonitrile membranes for highly efficient filtration of ultrafine particles. ***Journal of Materiomics*** 5, 422-427, (2019)

14. J. Li, **D. Zhang**, T. Yang *et al*. Nanofibrous membrane of graphene oxide-in-polyacrylonitrile composite with low filtration resistance for the effective capture of PM2.5. ***Journal of Membrane Science***, 551, 85-92, (2018)

Awards and Honors

- Joseph & Shirley Carleone Fund (awarded to graduate students in College of Engineering in good academic standing) Fall 2022
- The George Hill, Jr. Endowed Fellowship, College of Engineering, Drexel University 2019-2022
- Excellent Graduate in Beijing (1%) 2019
- Excellent Graduate in Tsinghua University (5%) 2019
- Science Innovation Award (5%) 2018
- 1st Prize in Beijing Contest District in 2017 China Undergraduate Mathematical Contest in Modeling(5%) 2017
- Sports Excellence Award (5%) 2016
- National Scholarship for Academic Excellence (10%) 2016 & 2017

Conferences

MRS 2023 spring | April 12, 2023.

- On-site Oral talk: electrochemically modulated interactions of MXenes with microwaves.

Pittcon conference | Mar 20, 2023

- On-site Poster: In situ monitoring redox activities in energy storage using UV-Vis spectroscopy

Activities

MXene Course Instructor | virtually | Oct 25th to MESC program students , Aug 7th to 11th 2023 , Feb 20th to 24th 2023, Feb 7th to 11th 2022, Aug 2nd to 6th 2021

- Giving lectures on "Fabrication of 2D Transition Metal Carbide (MXene) Transparent Films" and "Optical Properties of 2D Transition Metal Carbides (MXenes)".

Teaching Assistant for MATE 585 course "Nanostructured Carbon Materials" | Drexel University| 2023 winter quarter

Mentor | A. J. Drexel Nanomaterials Institute| 2021-present

- Graduate students: Mike Yelipashev (in situ optical microscopy)
- Undergrad students: Noel LoMonaco and Armen Shirozian (electrochromic behavior of vanadium oxide)
- High school students: Qixiang (Carnegie) Feng (optical microscopy/in situ cell assembly)
- Evaluation of etching MXenes (synthesis procedure): Teng Zhang, Tetiana Hryhorchuk, Aiden Cotton

Philly Materials day demo presenter: present MXenes demos to children, students, and their parents | Feb 11th, 2023.

Peer reviewer for 1) respected peer-reviewed journals: *ACS Nano, Nano Letters, Nano Energy, Applied Physics Letters, Nanophotonics, BioMed Research International Journal* ; and 2) Drexel Emerging Graduate Scholar Conference.

President of the Study Department | Student Union of SMSE, Tsinghua University| Nov 2016-Nov 2017

- Responsible for all study experience intercommunion meetings, including those on summer research , exchange projects, and double majors; Collected and delivered learning materials for every student in SMSE.
- Organized a freshman debate competition to discover debate talents and establish the 1st debate team in SMSE.

Skills

Languages: Chinese(native), English(advanced)

Experimental skills: SEM, XRD, Raman Spectroscopy, Electrospinning, CVD.

Computer skills: Origin, MATLAB.