

# XIANG WANG

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## EDUCATION

Ph.D. in Chemistry, **The Graduate Center of City University of New York**, New York, U.S. **February 2023**

Advisor: Prof. Michael V. Mirkin

*Thesis:* Nanoscale Imaging of Electrocatalytic Nanomaterials by High-resolution Scanning Electrochemical Microscopy

M.Sc. in Chemistry, **Shanghai University**, Shanghai, China **June 2014**

Advisor: Prof. Wei Yan

*Thesis:* Synthesis of nanocellulose-based nanocomposites and their electrochemical applications

B.Sc. in Chemistry, **Huangshan University**, Anhui, China **July 2011**

Advisor: Lect. Jinming Xu

*Thesis:* Interaction between the extraction of *Tripterygium Wilfordii* Hook and Bovine Serum Albumin

## PROFESSIONAL APPOINTMENTS

Postdoctoral Associate, Department of Chemistry, Texas A&M University **February 2023 – Present**

Host: Prof. Lane Baker

Research Focus: Nanoscale electrochemistry

## RESEARCH EXPERIENCE

**Queens College/The Graduate Center of City University of New York**

*Graduate student with Dr. Michael V. Mirkin*

Nanoscale SECM of electrocatalytical nanomaterials

- ❖ Fabricated Pt nanoelectrodes and disk-shape carbon fiber microelectrode with small RG
- ❖ Developed correlative multi-tech SECM imaging of single nanocatalyst on TEM grid
- ❖ Studied electrochemical properties and HER activities of 2D TMDCs (MoS<sub>2</sub> and PtSe<sub>2</sub>)
- ❖ Studied HER activity of Mixed Metal Nitride MXenes
- ❖ Investigated HOR activity of Ru-Ni diatomically doped porous carbon electrocatalyst in alkaline medium
- ❖ Instrumenting (hardware and software) new nanoSECM setup with higher accuracy and efficiency

**Shanghai University/ Nanoscience and Technology Research Center**

*Graduate student with Dr. Wei Yan*

Synthesis of nanocatalysts for electrochemical applications

- ❖ Synthesized platinum/cellulose nanocomposite in one step for H<sub>2</sub>O<sub>2</sub> electrochemical sensing
- ❖ Prepared 3D ordered macroporous Carbon Nanotube/Polypyrrole Composite for Supercapacitors
- ❖ Synthesized graphene oxide using modified Hummer's method
- ❖ Fabricated ZnO dye-sensitized solar cell

## BOOK CHAPTER

- (1) **Wang, X.**; Askarova, G.; Mirkin, M.V. *Electrochemical Microscopy at the Nanoscale*. In *Nanoscale Electrochemistry*; Wain, A. J., Dickinson, E. J.F., Eds. Frontiers of Nanoscience, Volume 18; Elsevier, 2021; pp 129-202. <https://doi.org/10.1016/B978-0-12-820055-1.00013-7>
- (2) **Wang, X.**; Askarova, G.; Mirkin, M.V. 2022. Nanoscale SECM. In *Scanning Electrochemical Microscopy*; pp.

## PEER-REVIEWED PUBLICATIONS

(\* Equal contribution)

- (1) Han, L.; Ou, P.; Liu, W.; **Wang, X.**; Wang, H.T.; Zhang, R.; Pao, C.W.; Liu, X.; Pong, W.F.; Song, J.; Zhuang, Z.; Mirkin, M. V.; Luo, Jun.; Xin, H. L. Design of Ru-Ni diatomic sites for efficient alkaline hydrogen oxidation. *Science Advances*, **2022**, 8, p.eabm3779. DOI: [10.1126/sciadv.abm3779](https://doi.org/10.1126/sciadv.abm3779)
- (2) Zhang, H.; Tamara, K. D.; **Wang, X.**; Hao, J.; Nanayakkara, S. U.; Attanayake, N. H.; Li, Z.; Mirkin, M. V.; Miller, E. M. Stabilizing the heavily-doped and metallic phase of MoS<sub>2</sub> monolayers with surface functionalization. *2D Mater.* **2021**, 9, 015033. <https://doi.org/10.1088/2053-1583/ac3f44>
- (3) Bo, T.; **Wang, X.**; Jia, R.; Han, L.; Xin, H.L.; Zhang, H.; Miller, E. M.; Mirkin, M.V. Probing Activities of Individual Catalytic Nanoflakes by Tunneling Mode of Scanning Electrochemical Microscopy. *J. Phys. Chem. C*. **2021**, 125, 46, 25525–25532. <https://doi.org/10.1021/acs.jpcc.1c07309>
- (4) Barman, K.\*; **Wang, X.\***; Jia, R.; Askarova, G.; Hu, G.; Mirkin, M.V. Voltage-Driven Molecular Catalysis of Electrochemical Reactions. *J. Am. Chem. Soc.* **2021**, 143, 42, 17344–17347. <https://doi.org/10.1021/jacs.1c07934>
- (5) Barman, K.; **Wang, X.**; Jia, R.; Askarova, G.; Mirkin, M.V. Mediated Charge Transfer at Nanoelectrodes: A New Approach to Electrochemical Reactivity Mapping and Nanosensing. *J. Am. Chem. Soc.* **2021**, 143, 23, 8547–8551. <https://doi.org/10.1021/jacs.1c02532>
- (6) Sarkar, S.; **Wang, X.**; Hesari, M.; Chen, P.; Mirkin, M.V. Scanning Electrochemical and Photoelectrochemical Microscopy on Finder Grids: Toward Correlative Multitechnique Imaging of Surfaces. *Anal. Chem.* **2021**, 93, 13, 5377–5382. <https://doi.org/10.1021/acs.analchem.1c00358>
- (7) Djire, A.\*; **Wang, X.\***; Xiao, C.; Nwamba, O.C.; Mirkin, V. M.; Neale, N.R. Basal Plane Hydrogen Evolution Activity from Mixed Metal Nitride MXenes Measured by Scanning Electrochemical Microscopy *Adv. Funct. Mater.* **2020**, 30, 2001136. <https://doi.org/10.1002/adfm.202001136>
- (8) **Wang, X.**; Han, L.; Xin, H.; Mirkin, M.V. TEM-Assisted Fabrication of Sub-10 nm Scanning Electrochemical Microscopy Tips. *Anal. Chem.* **2019**, 91, 24, 15355–15359. <https://doi.org/10.1021/acs.analchem.9b04316>
- (9) Bae, J. H.; Nepomnyashchii, A.; **Wang, X.**; Potapenko, D.; Mirkin, V. M. Photo-SECM on the Nanoscale with Through-Tip Illumination. *Anal. Chem.* **2019**, 91, 20, 12601–12605. <https://doi.org/10.1021/acs.analchem.9b03347>
- (10) Sun, T.; Zhang, H.; **Wang, X.**; Liu, J.; Xiao, C.; Nanayakkara, S.U.; Blackburn, J.L.; Mirkin, M.V.; Miller, E. M. Nanoscale mapping of hydrogen evolution on metallic and semiconducting MoS<sub>2</sub> nanosheets. *Nanoscale Horizons*, **2019**, 4, 619-624. <https://doi.org/10.1039/C8NH00346G>
- (11) Zhang, D.; Dong, Q.Q.; **Wang, X.**; Yan, W.; Deng, W.; Shi, L.Y. Preparation of a three-dimensional ordered macroporous carbon nanotube/polypyrrole composite for supercapacitors and diffusion modeling *J. Phys. Chem. C*. **2013**, 117, 20446–20455. <https://doi.org/10.1021/jp405850w>

## TEACHING EXPERIENCE

General Chemistry Lab 101/112 Queens College Fall 2017-Spring 2018

## WORKING EXPERIENCE

Process Engineer Unilever China Co., Ltd. July 2014-January 2015  
 Listening Trainer Global IELTS School February 2015- July 2016

## PRESENTATIONS

- (1) Poster: Gordon Research Conference 2022, Electrochemistry, Sept. 13, Ventura, CA
- (2) Zoom Oral: Pittcon Conference & Expo, Online, March 2021.
- (3) Poster: 10th International Workshop on SECM and Related Technique, Fontainebleau, France, October. 2019
- (4) Oral: Technical University of Denmark, Department of Chemistry, DTU Chemistry Young Researcher Mini Symposium, ‘Catalysts in Action’, Copenhagen, Denmark, September 2019.