

Xin Zhang, Ph.D.

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EDUCATION

Ph.D. in Chemical Engineering, University of North Dakota, Grand Forks, ND, **May 2023**

- Research: Clean Energy; Energy Storage; Electrochemistry; LIB/SIB Cathode and Anode Materials.
- Dissertation: The Design and Preparation of High-performance Silicon/Carbon Composite Anode for LIBs.

M.S. in Chemical Engineering, Guizhou University, Guiyang, China, **June 2017**

B.S. in Chemical Engineering, Qingdao University of Science and Technology, Qingdao, China, **June 2013**.

WORKING EXPERIENCE

- **Principal Scientist/Senior Material/R&D Engineer**, *Clean Republic SODO LLC.*, Grand Forks/Seattle, US (9/2023 – Present).

R&D Lead: Led the design, R&D, and industrialization validation of battery materials/processes (e.g., Li/Na-ion battery cathodes/anodes, solid-state electrolytes) and energy storage systems. **Project Development & External Cooperation:** Responsible for project application and initiation, driving collaborations with national laboratories/universities on joint projects; authored technical reports and patents; assisted the company in top-tier industry exhibitions, managing technical showcases and industry resource networking. **Systems Engineering & Product Support:** Provided technical support for key projects (HG, MSE, etc.), BMS R&D, energy storage system field demonstrations, and optimization of manufacturing/certification/quality inspection/processes.

- **Research Associate**, *CEM Energy Studies*, University of North Dakota, ND, US (5/2023 – 8/2023).
- **Graduate Research Assistant**, *Institute for Energy Studies*, University of North Dakota, ND, US (9/2018 – 5/2023).
- **Lithium Battery Manufacturing Intern**, *Clean Republic LLC*, Grand Forks, ND, US (9/2018 – 11/2020).
- **Lithium Battery CELL Manufacturing Intern**, *MICPOWER*, China (4/2018 – 8/2018).

PROFESSIONAL SUMMARY

- Results-driven Ph.D. in Chemical Engineering and battery technology expert with 8+ years of experience leading cutting-edge R&D and industrialization of energy storage systems (e.g., Li-ion and Na-ion batteries).
- A highly self-motivated, detail-oriented, and analytical professional with extensive hands-on experience and a rapid learning aptitude. A collaborative team player with strong interpersonal, problem-solving, and logical thinking skills.
- Demonstrated expertise in technical presentation, proposal writing, and communication. Languages: English (Full Professional Proficiency – all research communication, reporting, and presentations), Mandarin (Native).

TECHNICAL SKILLS (DIRECT EXPERIENCE)

- **Equipment & Operation** (Operating/installation/maintenance glove boxes, grinders, mixers, tube/box/muffle furnaces, jet mills, spray dryers, magnetic separators, compressors, nitrogen generators, entire battery manufacturing process-slurry preparation, coating, drying, calendaring, cutting, ultrasonic welding/spot welding/laser welding, electrolyte injection, formation, grading, testing). **Material Synthesis & Characterization** (Various material synthesis methods; advanced characterization tools such as Raman, XRD, XRF, SEM, TEM, EDS, XANES, and XPS). **Programming & Simulation** (3ds Max, Ansys Fluent, Aspen Plus, COMSOL, and Vensim; skilled in programming languages such as C, Python, and MATLAB). **Data & Office** (Access, GURU, Minitab, MySQL, OriginLab, SPSS, Microsoft Office).
- **Project Management:** Project planning, initiation, applications, and strategic budget preparation and control. Resource allocation and optimization, team leading, identify and manage risks, ensure quality standards, and track project progress. Contract management and stakeholder communication, smooth progress and successful completion of projects.

RESEARCH PROJECTS

- Eco-Friendly Manufacturing of High-Performance NaFePO₄-based Cathode Materials for Low-Cost and Long-Duration Sodium-Ion Batteries. (DOE-EERE-3236, **Co-PI**, 2025-Present)
- Demonstration and Scale-Up of a Low-Cost Long-Duration Energy Storage Technology for Lithium-ion Batteries. (ND CSEA, **Co-PI**, 2024-Present)
- Synergistic Design and Manufacturing for Polymer Composite Solid-State Electrolyte (Dakota Lithium and SDSMT, **Co-PI**, 2024-Present)
- MSE Generator coupled battery (Dakota Lithium and MSE, **Sci. & Tech.**, 2024-Present)
- HG Mower Power Battery System (Dakota Lithium and HG, **Sci. & Tech.**, 2022-2024)
- BMS Circuit Patent - 337 Investigation (Dakota Lithium, **Sci. & Tech.**, 2024)
- A Low Cost and Reproducible Synthetic Procedure for Mass Production of LFP Cathode Materials for LIBs. (Dakota Lithium Materials, **Key Personnel**, 2022-2023)
- Preparation of Graphene-Modified LFP Cathode for LIBs. (**Sci. & Tech.**, ND-REC, Phase I, II 2018-22)

- Production of Battery-grade FePO₄. (University of North Dakota, **Industrial Support**, 2023)
- The Preparation of Nano-silicon Enveloped Graphite Composite for High-Performance Lithium-ion Batteries. (GCL, **Key Personnel**, 2021-2023)
- Electrochemical Performance Improvement for Carbon Coated SiO_x and Graphite Composite LIB Anode by Chemical Pre-lithiation Process. (DOE DE-FE0031984, **Key Personnel**, 2021-22)
- The Preparation of a High-capacity Graphene Modified Graphite/SiO_x Anode Electrode for Commercial Button Batteries. (MicPower, **Key Personnel**, 2020-22)
- Porous Silicon/Lignite-derived Graphene Composite Anodes. (UCFER, **Key Personnel**, 2019-20)
- Freestanding Lignite-derived Graphene-based Foam Anode. (ND EPSCoP, **Co-PI**, 2019-20)

LIST OF PATENTS

1. **Xin Zhang**, et al. "LFP CATHODE MATERIAL FOR LITHIUM-ION BATTERIES, LIQUID-FREE SYNTHESIS METHOD THEREOF AND APPLICATION THEREOF." U.S. Patent Under Application, 2025.
2. **Xin Zhang**, et al. "Divergent Mixing Barrel for Silicon-based Anode Materials." *ZL 2024 2 3245504.8* (Authorized).
3. **Xin Zhang**, et al. "A Divergent Mixing Device for Anode Materials." *ZL 2024 2 3245508.6* (Authorized).
4. **Xin Zhang**, et al. "An Electrode Expansion Measurement Device for Lithium-ion Batteries." *ZL 2024 2 3245506.7* (Authorized).
5. Y. Lu, **Xin Zhang**, et al. "Catalyst for Oxidative Coupling of Methane, Preparation Method thereof and Application thereof." U.S. Patent No. 11,298,684. 12 Apr. 2022.

LIST OF PUBLICATIONS

1. **Xin Zhang**, et al. "Insights into Chemical Pre-lithiation of SiO_x/Graphite Composite Anodes through Scanning Electron Microscope Imaging." [J]. *ACS Appl. Energy Mater.*, 2023, 6, 7996-8005. [DOI](#)
2. **Xin Zhang**, et al. "Coal-Derived Graphene Foam and Micron-sized Silicon Composite Anodes for Lithium-ion Batteries." [J]. *Electrochim. Acta*, 2022, 141329. [DOI](#)
3. **Xin Zhang**, et al. "Electrode Optimization of SiO_x/Graphite Anode for Lithium-ion Batteries Using a Taguchi Design Method." 2025, Under review.
4. **Xin Zhang**, et al. "Non-woven Carbon Fiber Substrate for Bipolar High-energy Density Lithium-ion Batteries." 2025, Under review.
5. W. Sun, **Xin Zhang**, et al. "Facile Synthesis of Porous Carbonized Humic Acid as a Binder-Free Electrode for High-Capacitance Applications." [J]. *ACS Appl. Energy Mater.*, 2025. [DOI](#)
6. B. Ye, **Xin Zhang**, et al. "Real-time optimal control of integrated power systems via deep neuro-dynamic programming." [J]. *Energy Source Part B.*, 2025: 2530518. [DOI](#)
7. F. Li, **Xin Zhang**, et al. "Investigation on specific evaporation rates during biosolid air drying process." [J] *EP&SE*, 2025 e14538. [DOI](#)
8. F. Li, **Xin Zhang**, et al. "Settling model to predict microplastics removal efficiency in wastewater treatments." [J] *EP&SE*, 2025 e14506. [DOI](#)
9. F. Li, **Xin Zhang**, et al. "Biosolid Gasification Performance Prediction Using a Stoichiometric Thermodynamic Model." [J] *ACS Omega*, 9.30 (2024): 32639-32650. [DOI](#)
10. F. Li, **Xin Zhang**, et al. "Decision Tree Model to Classify Wastewater Evaporation." [J] *Ind. Eng. Chem. Res.*, 2023 62(20), 8111-8117. [DOI](#)
11. S. Saha, ... & **Xin Zhang**, et al. "Investigating the Tribological and Corrosion behavior of Co–Cr Alloy as an Implant Material for Orthodontic Applications." [J]. *Wear*, 2023, 204755. [DOI](#)
12. R.I. Pushparaj, ... & **Xin Zhang**, et al. "Coal-derived Porous Carbon Anodes for Na-ion Batteries." [J]. *Renew. Sustain. Energy Rev.*, 2024(1): 0004. [DOI](#)
13. S. Xu, ... & **Xin Zhang**, et al. "In-situ Synthesis of Graphene-coated Silicon Monoxide Anodes from Coal-derived Humic Acid for High-performance Lithium-ion Battery." [J]. *Adv. Funct. Mater.*, 2021, 2101645. [DOI](#)
14. P. Wang, **Xin Zhang**, et al. "Oxidative Coupling of Methane: MO_x-modified (M=Ti, Mg, Ga, Zr) Mn₂O₃-Na₂WO₄/SiO₂ Catalysts and Effect of MO_x Modification." [J]. *Chin. J. Catal.*, 2018, 39(8): 1395-1402. [DOI](#)
15. R.I. Pushparaj, ... & **Xin Zhang**, et al. "Coal-Derived Graphene/MoS₂ Heterostructure Electrodes for Li-ion Batteries: Experiment and Simulation Study." [J]. *ACS Appl. Mater. Interfaces.*, 2021, 59950. [DOI](#)
16. H. pan, ... & **Xin Zhang**, et al. "Catalytic Combustion of Styrene over the Binary Mixture of Manganese and Copper-based Catalyst in the Absence and Presence of Water." [J]. *Kinet. Catal.*, 2018: 296-303. [DOI](#)
17. Z. Chen, ... & **Xin Zhang**, et al. "The Modification of Pd Core–silica Shell Catalysts by Functional Molecules (KBr, CTAB, SC) and their Application to the Direct Synthesis of Hydrogen Peroxide from Hydrogen and Oxygen." [J]. *Catal. Sci. Technol.*, 2017, 7, 1415-1422. [DOI](#)

LIST OF CONFERENCE PROCEEDINGS & POSTER PRESENTATIONS

1. **Xin Zhang**, et al. "Electrochemical Performance Improvement for Carbon Coated SiO_x and Graphite Composite Lithium-ion Battery Anode by Chemical Pre-lithiation Process." Poster Presentation, 4th AIChE Battery and Energy Storage Conference, NY, USA. 2022.
2. **Xin Zhang**, et al. "Coal-derived Graphene-based Freestanding Si@G Foam Anode for Lithium-ion Battery." Podium Presentation, 3rd AIChE Battery and Energy Storage Conference. Podium Presentation, USA. 2021.
3. **Xin Zhang**, et al. "Coal-derived Graphene as a 3D Free-standing Lithium-ion Battery Anode." Poster & Podium Presentation, ND EPSCoR State Conference, ND, USA. 2021.
4. **Xin Zhang**, et al. "Improving Electrical Conductivity of Carbon Fiber for Flexible Battery by Metal Electrodeposition Method. Poster Presentation." AIChE Annual Conference, FL, USA. 2019.
5. M. Lei, **Xin Zhang**, et al. "Comparative Analysis of Serial-Parallel vs. Parallel-Serial MOSFET Configurations for Battery Management Systems." ISICN, San Juan, Puerto Rico, USA. 2025.
6. R. Zhang, ... **Xin Zhang**, et al, "Chemical Pre-lithiation of Lignin-derived Hard Carbon Aimed for Lithium-ion Battery Anode with High Rate Performance." Presentation, AIChE Annual Conference, AZ, USA. 2022.

HONORS & AWARDS

- **Scientific Excellence Award (2025):** Recognized for pivotal contributions to core technology breakthroughs and IP strategy, securing 3 authorized patents and 1 core application within a single year.
- **R&D Leadership Excellence Award (2024):** Honored for exceptional leadership in securing two major grants (~\$4M total) from the DOE and State Government, coordinating roadmaps between industry, academia, and research institutes.
- **Bright Idea Award (2023):** Awarded for the innovative "Dry-Mixing Process" solution that resolved pilot-scale efficiency bottlenecks, significantly reducing operational costs and environmental emissions.