

Zhenghang Zhao

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Ph.D candidate

3940 N Elm St Suite E148 Denton, TX, 76207, USA

EDUCATION

- **University of North Texas**, Denton, TX, USA, Doctor of Philosophy, May. 13 2017

Relevant courses: Introduction to Materials Science and Engineering; Bonding, Structure and Crystallography; Solid State Physics; Polymer processing and rheology; Thermodynamics; Electronic Properties of Materials

- **China University of Mining and Technology**, Beijing, China, Bachelor of Engineering, Jul. 1 2012

Relevant courses: Advanced math; ANSYS software; Linear Algebra; AutoCAD; MATLAB; Theoretical Mechanics; Solid Mechanics; Fluid Mechanics; Fracture Mechanics; Elasticity of Mechanics; Plasticity of Mechanics; C language

RESEARCH EXPERIENCE

Research Assistant, Materials Science and Engineering, University of North Texas, 2012-present

- Density functional theory calculations of electrochemical reactions on carbon nanomaterials for fuel cells and metal-air batteries. Design principle of heterogeneous catalysis on multi materials. (6 publications, 3 submitted, 2 in preparation)
- Molecular dynamics calculations of nanoindentation on metals. (1 publication)

TEACHING EXPERIENCE

MTSE 3010/5010	Bonding, structure and crystallography	2012-2013
MTSE 3070	Electrical, optical and magnetic properties of materials	2013

TECHNICAL PRESENTATIONS

1. *Catalytic Mechanisms of Doped Graphene as Efficient bifunctional Catalysts for Fuel Cells and Metal-air Batteries*,
Invited Talk, Southeastern Louisiana University, Hammond, LA, USA, Apr. 2016
2. *Catalytic Mechanisms of Doped Graphene as Efficient Catalysts for Fuel Cells and Metal-air Batteries*,
Technical Presentation, IMECE 2015, ASME conference, Houston, TX, USA, Nov. 2015
3. *Carbon-based Bifunctional Catalysts For Fuel Cells And Metal-air Batteries*,
Graduate Seminar Showcase, University of North Texas, Denton, TX, USA, Apr. 2015
4. *Nanoindentation on FCC Nickel for Different Crystalline Orientation Using Molecular Dynamics Method*,
The Second International Conference on Metallic Materials and Processing, Las Vegas, NV, USA, Oct. 2014
5. *Nanoindentation on FCC Nickel for Different Crystalline Orientation Using Molecular Dynamics Method*,

PUBLICATIONS

1. **Zhenghang Zhao**, Zhenhai Xia: *Theoretical Study of Doped Graphene as Effective Catalysts in Dye-Sensitized Solar Cells*. *Nature Energy* (Submitted/under-review)
2. Chengdong Bai, Mingsen Zheng, Chuangang Hu, **Zhenghang Zhao**, Zhenhai Xia, Jianchuan Ye, Zhongqun Tian, Liming Dai, Quanfeng Dong: *Ion coupling for boosting catalytic activities of heteroatom-doped carbon catalysts*. *Science Advances*. (Submitted/under-review)
3. Chun-Yu Lin, Lipeng Zhang, **Zhenghang Zhao**, Zhenhai Xia: *Design Principles for Covalent Organic Frameworks as Efficient Electrocatalysts in Clean Energy Conversion and Green Oxidizer Production*. *Advanced Materials*. (Accepted/In-press)
4. Zhijuan Liu, **Zhenghang Zhao**, Zhenhai Xia, Shuangyin Wang: *Edge-and Defect-rich Carbon Cloth with Graphene-like Carbon Nanosheets for Oxygen Electrocatalysis*. *Advanced Materials*. (Accepted/In-press)
5. Chun-Yu Lin, **Zhenghang Zhao**, Jianbing Niu, Zhenhai Xia: *Synthesis, Properties and applications of 3D Carbon Nanotube-Graphene Junctions*. *Journal of Physics D: Applied Physics*. 49.44 (2016): 443001
6. **Zhenghang Zhao**, Zhenhai Xia: *Design Principles for Dual-Element-Doped Carbon Nanomaterials as Efficient Bifunctional Catalysts for Oxygen Reduction and Evolution Reactions*. *ACS Catalysis* 02/2016; 6(3):1553-1558. DOI:10.1021/acscatal.5b02731
7. **Zhenghang Zhao**, Zhenhai Xia: *Interactions between Dopants in Dual-Doped Graphene Nanoribbons as Metal-Free Bifunctional Catalysts for Fuel Cell and Metal-Air Batteries*. *MRS Advances* 1-5 01/2016; -1:1-5. DOI:10.1557/adv.2016.32
8. **Zhenghang Zhao**, Lipeng Zhang, Zhenhai Xia: *Electron Transfer and Catalytic Mechanism of Organic Molecule-Adsorbed Graphene Nanoribbons as Efficient Catalysts for Oxygen Reduction and Evolution Reactions*. *The Journal of Physical Chemistry C* 01/2016; 120(4). DOI:10.1021/acs.jpcc.5b09611
9. **Zhenghang Zhao**, Mingtao Li, Lipeng Zhang, Liming Dai, Zhenhai Xia: *Design Principles for Heteroatom-Doped Carbon Nanomaterials as Highly Efficient Catalysts for Fuel Cells and Metal-Air Batteries*. *Advanced Materials* 09/2015; 27(43). DOI:10.1002/adma.201503211
10. Jintao Zhang, **Zhenghang Zhao**, Zhenhai Xia, Liming Dai: *A metal-free bifunctional electrocatalyst for oxygen reduction and oxygen evolution reactions*. *Nature Nanotechnology* 04/2015; 10(5). DOI:10.1038/nnano.2015.48
11. Reza Mirshams, **Zhenghang Zhao**, Zhiqiang Wang: *Experimental analysis and computational modeling of pile-up formation in nanoindentation*. *Mexican Journal of Materials Science and Engineering* 2014; 1(1)
12. **Zhenghang Zhao**, Zhenhai Xia: *Rational Design of Efficient Metallic Core-Shell Electrocatalysts for Oxygen Reduction and Evolution Reactions*. (In progress)
13. **Zhenghang Zhao**, Chun-Yu Lin, Lipeng Zhang, Zhenhai Xia: *Toward Rational Design of Efficient Carbon-based Electrocatalysts for Energy Conversion and Storage*. (In progress)

AWARDS & GRANTS

- Graduate Travel Grant, College of Engineering, University of North Texas, 2014-2016

SKILLS & ACTIVITIES

- **Skills:**

Density Functional Theory, Quantum Chemistry, Solid State Physics, Molecular Dynamics, Quantum Monte Carlo, Parallel Computing, High-Performance Computing

- **Software:**

VASP, Quantum Espresso, LAMMPS, ANSYS, ABAQUS, MATLAB

- **Programming language: C++, Fortran, Python, Unix**

- **Activities:**

Judge, Second Graduate Exhibition, University of North Texas, Mar. 2014

Reviewer, ACS catalysis, 2016

IMECE 2016, ASME conference, Phoenix, Nov. 2016

Chemical Physics Letters, 2016

Journal of Composites, 2016

IMECE 2015, ASME conference, Houston, Nov. 2015

Graduate fellow, Advanced Materials and Manufacturing Processes Institute (AMMPI), University of North Texas, 2015-2016

- **Language:**

Chinese (Native) and English (Full professional working proficiency)