

Jie Zhao

308 North Lincoln Ave, Urbana, IL, Email: jiezhao5@illinois.edu, Phone: 2173053458

EDUCATION

Shanghai Jiao Tong University (SJTU)

Shanghai, China

BSc. in Zhiyuan College, major in physics (Top-notch Talent Cultivation Plan)

09/2015 – 06/2019

University of Illinois Urbana-Champaign

Champaign, USA

PhD program, Materials Science & Engineering

08/2019 - Present

RESEARCH INTEREST

- Ultra-fast Differential Scanning Calorimeter technique
- 2D self-assembled layers(layered silver alkanethiolate)
- Phase-changing memory-storage material

PUBLICATIONS

- **Zhao, Jie**, et al. "Exploring "No Man's Land"—Arrhenius Crystallization of Thin - Film Phase Change Material at 1 000 000 K s⁻¹ via Nanocalorimetry." *Advanced Materials Interfaces* (2022): 2200429.
- Hui, J., Hu, Q., Zhang, H., **Zhao, J.**, Luo, Y., Ren, Y., ... & Wang, H. (2022). High-throughput investigation of structural evolution upon solid-state in Cu–Cr–Co combinatorial multilayer thin-film. *Materials & Design*, 215, 110455.
- **Zhao, Jie**, et al. "Revealing the nature of size and odd/even effect observed by NanoDSC in 2D organic metal chalcogenides: atomic resolution crystallography via diffraction and ab initio calculations." *Bulletin of the American Physical Society* (2021).
- **Zhao, Jie**, et al. "Revealing the nature of size and odd/even effect observed by NanoDSC in 2D organic metal chalcogenides: atomic resolution crystallography via diffraction and ab initio calculations." *Bulletin of the American Physical Society* (2021).
- **Zhao, Jie**, and Yongxiang Hu. "Surface morphology formation of Ti films in laser-induced forward transfer." *Surface Topography: Metrology and Properties* 7.2 (2019): 025022.
- **Zhao, Jie**, Yongxiang Hu, and Zhenqiang Yao. "Laser Induced Forward Transfer: Topography Dependence of Laser Fluence and Thickness for Titanium Film." *ASME 2018 13th International Manufacturing Science and Engineering Conference*. American Society of Mechanical Engineers, 2018.
- Wei, Xiangzhi, **Jie Zhao**, and Siqi Qiu. "Circle-Point Containment, Monte Carlo Method for Shape Matching Based on Feature Points Using the Technique of Sparse Uniform Grids." *Journal of Computing and Information Science in Engineering* 18.1 (2018): 011008.
- Xianda Li, **Jie Zhao**, Ren He, Yaobin Tian and Xiangzhi Wei. "Parametric Design of Scalable Mechanisms for Additive Manufacturing." *Journal of Mechanical Design* 140.2 (2018): 022302.

RESEARCH

Research Assistant

Materials Science and Engineering, University of Illinois at Urbana-Champaign

Advisor: **Professor Leslie H Allen**

08/2019-present

Project 1: Local Atomic-level Thermodynamic Probe for Nanoscience of 2D Membranes: Synthesis, NMR and Nanocalorimetry Study

- Synthesis AgSCn and conduct NMR measurement on the sample with consistent results compared with previous sample.
- Work with DFT calculation group and extract structure information from the DFT result.

Project 2: Thin film nano-DSC measurement with Indium

- Build RGA detector into the system and determined the level of contamination in the evaporator from the oil pump
- Redesign the LN2 cooling system for the evaporator
- Deposit 50nm Indium onto the nano-DSC sensor in the evaporator and conduct nano-DSC measurement which gives reasonable cp curve compared with bulk Indium.

Project 3: high temperature Nano-DSC measurement on phase-changing material GeSbTe

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- Rewrote the data analysis program in MATLAB in order to fix the problem in weird 3rd baseline.
- Rewrote the LabVIEW code to realize programmable remelting and cooling of the sensor.
- Finite element analysis to explain the strange tail effect in high temperature Nano-DSC.
- Calculated the cp in cooling mode.

Visiting Research Student

Department of Physics, Harvard University

Advisor: **Professor Jenny Hoffman**

08/2018 – 01/2019

Project 1: Design of a coarse motion xy-walker to be assembled in scanning tunneling microscope (STM)

- Designed the xy-walker in SolidWorks and conducted simulation on the model to find out the resonant frequency of the xy-walker, further optimized the design so that the noise of the system can be controlled.
- Tested the xy-walker and improved its behavior by modifying the LabVIEW controller and circuit.
- Fabricated different titanium components of the xy-walker after 14 hours of work in the machine shop.

Project 2: Design of Pt-Ir tip-etching platform for STM

- Built a device for etching the Pt-Ir tip used in STM. The SEM pictures showed repeatable etching of 100 nm-radius STM tips with uniform profile.

Project 3: STM characterization of topological surface states on Sb (111)

- Conducted tip-fixing on Sb and obtained the typical dI/dV spectrum of Sb. Measured the dI/dV map on mesas found on the surface of Sb and observed standing-wave patterns caused by the transmission of topological surface states.

Undergraduate Research Student

Materials Genome Initiative Center, SJTU

Advisor: **Professor Hong Wang**

08/2017 – 06/2019

Project 1: Establish the phase diagram of Ni-Ti-Cu shape memory alloys

- Developed LabVIEW code to realize joint control of x-ray fluorescence (XRF) and x-ray diffraction (XRD) detectors with dynamic link library (dll).
- Went to Argonne National Laboratory to conduct high-throughput synchrotron x-ray diffraction characterization of the chips with APS.

Project 2: Simulation of temperature field during in situ heating progress

- Simulated the temperature field of the chip after irradiated by the pulsed laser using the finite element method. Critical laser fluence for the martensitic transformation of Ti-Ni-Cu thin films from B2 (cubic) to B19 (orthorhombic) predicted by simulation agreed with experimental results.

Undergraduate Research Student

State Key Laboratory of Mechanical System and Vibration, SJTU

Advisor: **Professor Yongxiang Hu**

04/2017- 06/2019

Project 1: Surface topography study of laser-induced forward transfer (LIFT) with Ti

- Observed and classified the topography on titanium film irradiated by the pulsed laser and discovered in the first time a special topography with Ti surface sinks in the center.
- Set up a theoretical model to predict the temperature evolution in Ti film with finite element analysis in MATLAB and verified the mechanism for different types of topography.

Project 2: Fabrication of broadband absorbing metamaterial through LIFT with Cu

- Optimized experimental parameters to realize successful printing of copper bars with a diameter smaller than 5 μ m onto the receiver substrate.

RESEARCH SKILL

- Proficient in operating Nano-DSC, STM, XRD and ultrashort pulsed laser.
- Rich experiment in Solidworks, LabVIEW, MATLAB.
- Rich experience in maintaining high-vacuum and cryogenic system.

SELECTED COURSES

- **Core courses:** ECE340 Semiconductor Electronics A+; MSE500 Statistical Thermodyn of Matls A+

AWARDS AND HONORS

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- Second Prize Award in Summer social practice of Shanghai Jiao Tong University 07/2017
- Scholarship of 'Han Ying Ju Hua' (**Top 20 students of 400** in Zhiyuan College) 05/2017
- Shanghai Jiao Tong University ' Merit Student ' 11/2016
- National Scholarship (**Top 5%** in the School of Physics) 10/2016
- First prize at China Undergraduate Physics Tournament (**best prize in the history of SJTU**) 08/2016