

HONGLIANG ZHANG

Postdoctoral Research Associate

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APPOINTMENTS

2020.01-present Assistant Scientist, Department of Engineering Physics; University of Wisconsin-Madison

2018.08-present Postdoctoral Researcher, Department of Materials Science & Engineering; University of Wisconsin-Madison Postdoctoral Advisors: Prof. Izabela Szlufarska

2017.01-2018.02 Research Assistant, Center for Advanced Energy Studies, Idaho National Laboratory Advisor: Dr. Haiming Wen

2013.09-2018.06 Research Assistant, Department of Nuclear Science and Technology, Fudan University Advisor: Prof. Liqun Shi

EDUCATION

2013.09- 2018.07 PhD in Particle Physics, Fudan University, Shanghai, China

2017.01-2018.02 Visiting PhD student in Center for Advanced Energy Study (CAES), Idaho National Lab, Idaho Falls, Idaho, U.S

2009.09-2013.07 Bachelor's in Nuclear Technology, Fudan University, Shanghai, China

■ Total GPA: 3.5/4.0, Ranking 1/13 in Institute of Modern Physics; Major GPA: 3.7/4.0

SKILLS&KNOWLEDGE

- TEM, STEM, HRTEM, EBSD, tEBSD, SEM, FIB, XRD, Raman spectrum, Nanoindentation, in-situ micro compression test and Synchrotron GIXRD.
- Familiar with operating and data analysis of Ion Beam Analysis Tech including RBS, ERD, PIXE and NRA.
- Experiences in using hot pressing synthesis and magnetic sputtering deposition.
- **Major Courses:** Quantum mechanics, Nuclear physics, Thermodynamics and statistical physics, Electrodynamics, Nuclear electronics, Nuclear radiation detection, Ion beam physics Probability and statistics, Linear algebra, Higher mathematics

RESEARCH EXPERIENCE & COURSE PROJECTS

Coupled Effects of Radiation and Chemical Environment on Interfaces in SiC

PI: Prof. Izabela Szlufarska

2018.7-present

- Fabrication of SiC Bicrystal materials

- Radiation-induced segregation in SiC and SiC composite materials
- Irradiation effects of SiC bulk materials, SiC-CNT and SiC-rGO materials
- Preparation of SiC/TiC, SiC/Ti₃SiC₂ multilayer system materials
- DFT study of the irradiation effects of structural materials

Synthesis and irradiation effects study of MAX phase materials

Supervisor: Prof. Liquan Shi

2014.6- Present

- Synthesis of Ti₃SiC₂、Ti₃AlC₂、Ti₂AlC、Cr₂AlC bulk MAX phase materials by hot pressure
- Deposition of Ti₂AlC MAX phase films by radio frequency magnetron sputtering
- Study of helium irradiation tolerance, damage evolution and annealing recovery properties of Ti₃SiC₂ bulk MAX phase materials using TEM, GIXRD, SEM, etc.

The Study of Irradiation effects of Iron and High-entropy Alloy as Structural Materials

Supervisor: Dr. Haiming Wen

2017.01-2018.02

- Fabrication and irradiation of HP and ECAP iron materials
- Microstructure analysis of the irradiated samples

The Application of Ion Beam Analysis in Nuclear Energy Materials

Supervisor: Prof. Liquan Shi

2012.9-present

- Determination of Depth profiles of D and T in Metal-hydride films
- Ta/TiH_x/Si samples prepared by radio frequency magnetron sputtering deposition
- Elastic recoil cross section determination of ¹H by ⁴He and ¹H by ¹²C
- Collaboration of the accelerator using nuclear resonant reaction

⁴He thermal desorption behaviors of LaNiAlMn and ZrCo films

Supervisor: Prof. Liquan Shi

2013.7-2014.7

- Preparation of LaNiAlMn and ZrCo films with different helium concentration
- Dynamic thermal desorption experiments of LaNiAlMn and ZrCo films with different helium contents from RT to 1050°C

PUBLICATIONS

- 1. **Hongliang Zhang**, Ranran Su, Liquan Shi, Haiming Wen. Structural changes of Ti₃SiC₂ induced by helium irradiation with different doses. Applied Surface Science, 434, (2018), 1210-1216.
- 2. **Hongliang Zhang**, Ranran Su, Liquan Shi, The damage evolution of He irradiation on Ti₃SiC₂ as a function of annealing temperature, Journal of the European Ceramic Society 38 (2018) 1253–1264
- 3. **Hongliang Zhang**, Weiyuan Zhang, Ranran Su, Liquan Shi, Deuterium trapping in the carbon-silicon co-deposition layers prepared by RF sputtering in D₂ atmosphere, Journal of Nuclear Materials, 2018, 501: 217-223.
- 4. Ranran Su, **Hongliang Zhang**, et al. Formation of nanostructures in Ti₂AlC induced by

high-temperature helium irradiation[J]. Journal of the European Ceramic Society, 2019, 39(6): 1993-2002. **Co first author**

- 5. Hubin Luo, Hongwei Shen, **Hongliang Zhang**, et al. Plasticity without dislocations in a polycrystalline intermetallic[J]. **Nature communications**, 2019, 10(1): 1-8. **First experimental author**
- 6. **Hongliang Zhang**, Xinghua Tang, Liqun Shi, Elastic recoil cross section determination of ^1H by ^4He ions at 30° and energy range of 1.6–6.0 MeV, Nuclear Instruments and Methods in Physics Research B 335 (2014) 85–88
- 7. **ZHANG Hong-Liang**, SHI Li-Qun SU Ran-Ran Behavior of He in Zr-Co Films, Acta Phys. -Chim. Sin. 2015, (Suppl.), 106-110
- 8. **Hongliang Zhang**, Ranran Su, Liqun Shi.. "Post Irradiation Examination and Advanced Measurement Techniques—II."
- 9. **Hongliang Zhang**, Wei Ding, Ranran Su, Liqun Shi. Depth profiles of D and T in Metal-hydride films up to large depth. Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms, 2016, 371: 174-177.
- 10. **Hongliang Zhang**, Ranran Su, Liqun Shi. "Thermal desorption behaviors of helium in Zr-Co films prepared by sputtering deposition method." Vacuum 130 (2016): 174-178.
- 11. Ranran Su, **Hongliang Zhang**, Liqun Shi. "Synthesis of Cr_2AlC thin films by reactive magnetron sputtering." Fusion Engineering and Design 125 (2017): 562-566.
- 12. Ranran Su, **Hongliang Zhang**, Liqun Shi. "Deposition and characterization of Ti_2AlC MAX phase and Ti_3AlC thin films by magnetron sputtering." Materials Letters 179 (2016): 194-197.
- 13. Yang Zhang, **Hongliang Zhang**, Zhibin Han, Liqun Shi, Measurements of the elastic recoil cross-section for $^1\text{H}(^{12}\text{C}, ^1\text{H})^{12}\text{C}$ Nuclear Instruments and Methods in Physics Research B 346 (2015) 17–20
- 14. Ranran Su, **Hongliang Zhang**, etc. Irradiation effects on Ti_2AlC thin films, Transactions of the American Nuclear Society 117, pp. 584-586
- 15. Ranran Su, **Hongliang Zhang**, etc. Deposition of Ti_2AlC thin film Transactions of the American Nuclear Society 116, pp. 468-471
- 14. Patent: A New Method to Measure the Nuclear Reaction Cross Section of Hydrogen and Helium Isotope, Chinese patent (**Hongliang Zhang**, Liqun Shi, Ranran Su and Zhibin Han)
- 15. Patent: A New Method for Synthesis of MAX Phase Materials, Chinese patent (Ranran Su, Liqun Shi, **Hongliang Zhang**)

Submitted

Christos Athanasiou*, **Hongliang Zhang**, Izabela Szlufarska*, etc. Ultra-high toughness ceramic nanocomposites via ion-beam engineered interfaces

Xing Wang, **Hongliang Zhang**, Tomonori Baba, Izabela Szlufarska*, etc. Radiation induced segregation in a ceramic.

Hongliang Zhang, Ranran Su, Haiming Wen*, etc. Helium irradiation study on Ti_3SiC_2 at room temperature and 750 °C

CONFERENCE POSTERS AND PRESENTATIONS

- ◆ The Application of Ion Beam Analysis in Nuclear Energy Materials, invited talk 23rd International Conference on Ion Beam Analysis (IBA-2017) 2017.10
- ◆ Helium Irradiation Tolerance of Ti_3SiC_2 MAX phase, oral presentation, ANS annual conference, 2017.06
- ◆ Determination of the Depth profiles of hydrogen isotopes in Metal-hydride films, oral presentation, Conference on Nuclear Testing and Analysis, 2016.11
- ◆ Synthesis and irradiation tolerance of MAX phase materials, oral presentation, 13th China-Japan Symposium on Materials for Advanced Energy Systems and Fission & Fusion Engineering, 2016.10
- ◆ Helium Irradiation Tolerance And Recovery Properties of Ti_3SiC_2 MAX phase, poster The 9th International Conference on High-Performance Ceramics (CICC-9), Guilin, China, 2015.10
- ◆ Irradiation Tolerance of Ti_3SiC_2 MAX phase, invited talk The 2nd China International Congress on Composite Materials, Zhenjiang, China, 2015.9
- ◆ Depth profiles of hydrogen isotopes in Metal-hydride films up to large depth, 22nd International Conference on Ion Beam Analysis, Opatija, Croatia, 2015.6
- ◆ Behavior of He in LaNiAlMn Films, The 1st China Conference on Actinide Physics and Chemistry, Beichuan, China, 2014.8

SELECTED HONORS AND AWARDS

- Outstanding graduates of Fudan University, 2018
- China National Scholarship, 2017
- Guorui Scholarship, Fudan University, 2016
- Graduate student Scholarship First-Class, Fudan University, 2015
- Guanghua Scholarship First-Class, Fudan University, 2014
- Graduate Freshman Scholarship First-Class, Fudan University, 2013
- Outstanding Graduate Scholarship First-Class, Fudan University, 2013
- National Motivational Scholarship, 2012
- National Motivational Scholarship, 2011
- Outstanding Volunteer for the Shanghai EXPO, 2010

PROFESSIONAL ACTIVITIES

Invited reviewer for Science Journal of Chemistry, Journal of Materials Science, Journal of Materials Science and Nanotechnology, Nuclear Instruments and Methods in Physics Research B: Beam Interactions with Materials and Atoms