

Yajie Zhao

Research assistant/Graduate student

UT Institute for Advanced Materials & Manufacturing, 2641 Osprey Vista Way, Knoxville, TN 37920

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Education/Training

B.E. in Materials Science and Engineering

University of Science and Technology Beijing (USTB)

Sep 2012 – Jun 2016

Beijing, China

PhD in Materials Science and Engineering (in progress)

The University of Tennessee, Knoxville (UTK)

Aug 2016 – Now

Knoxville, TN, US

Thesis title: “Kinetics and phase stability of Cr-rich precipitates in FeCr alloys during ion irradiation”

Advisor: Prof. Steven J. Zinkle, Governor’s Chair Professor (szinkle@utk.edu)

Skills

Material characterization

TEM and APT sample preparation using FIB, SEM, APT, TEM

Computer

Python, Origin, Office, SRIM, MATLAB, C++

Language

Fluent in Chinese and English

Conference Activities

- Poster in ICACC conference Jan 2018, Daytona Beach, FL, US
Raman spectroscopy experiments to characterize radiation induced defects in SiC/SiC composites
- Oral presentation in TMS conference Mar 2019, San Antonio, TX, US
Ion irradiation induced alpha prime precipitate formation in high purity Fe-Cr alloys
- Oral presentation in MiNES conference Oct 2019, Baltimore, MD, US
Ion irradiation induced alpha prime precipitation in high purity Fe18Cr
- Poster in ICFRM conference Oct 2019, San Diego, CA, US
Dose rate and temperature effect on irradiation enhanced α' precipitation in ultra-high purity Fe-Cr alloys
- Oral presentation in TMS conference Feb 2020, San Diego, CA, US
 α' precipitation in ion – irradiated high purity Fe-(10~18)Cr alloys
- Poster in MRS conference Nov 2020, Virtual
Dose rate and temperature effect on the alpha prime precipitation in ion irradiated ultra-high purity Fe-Cr alloys
- Oral presentation in TMS conference Mar 2021, Virtual
Kinetics and phase stability of Cr-rich precipitates in Fe18Cr alloys during ion irradiation

Awards and Honors

- Volunteer of Distinction Award of Professional Promise, granted by the University of Tennessee (Office of the Provost), USA Mar, 2022
- Research proposal “A study on the ballistic dissolution effect of single displacement cascade on FeCr and FeCu binary alloys”, awarded by CNMS, ORNL (CNMS2020-A-00942) Jun, 2021
- Research proposal “Determining the phase boundary between a and a+a’ at low-temperatures with proton irradiations and APT”, awarded by CNMS, ORNL (CNMS2020-A-00940) Jun, 2021
- Center for Materials Processing (CMP) Graduate Student Support (\$15,000 USD), funding from the State of Tennessee and Tennessee Higher Education Commission (THEC), US Jan, 2021
- Research proposal “A direct observation for the ballistic dissolution of a’ precipitates in high purity Fe18Cr alloy”, awarded by CNMS, ORNL (CNMS2020-B-00435) Jun, 2020

- Research proposal “A study of surface and injected ions effect on the formation of α' precipitates in high purity Fe18Cr alloy”, awarded by CNMS, ORNL (CNMS2020-A-00123) Dec, 2019
- Third Place of the Student (poster) Night co-hosted by the Oak Ridge Chapter of ASM, the Center for Materials Processing (CMP), and the American Association of Crystal Growers Southeast Section Oct, 2019
- MSE GRA Travel Award (\$500 USD), granted by the University of Tennessee, USA Feb, 2019
- Research proposal “Ion irradiation induced alpha prime precipitate formation in high purity Fe-Cr alloys”, awarded by Center for Nanophase Materials Sciences (CNMS), ORNL (CNMS2019-R021) Jan, 2019
- Second Place of the Engineering Ceramics Division (ECD) Best Poster Awards. Daytona Beach, FL, US Jan 2018

Publications

Peer-Reviewed Journal Articles

Y. Zhao, A. Bhattacharya, C. Pareige, C. Massey, P. Zhu, J. D. Poplawsky, J. Henry, and S. J. Zinkle. “Effect of heavy ion irradiation dose rate and temperature on α' precipitation in high purity Fe-18%Cr alloy”, *Acta Materialia* (2022): 117888.

P. Zhu, **Y. Zhao**, S. Agarwal, J. Henry, and S. J. Zinkle. "Toward accurate evaluation of bulk hardness from nanoindentation testing at low indent depths." *Materials & Design* 213 (2022): 110317.

S. Agarwal, Q. Chen, K. Takaaki, **Y. Zhao**, S. J. Zinkle, and W. J. Weber. "Revealing irradiation damage along with the entire damage range in ion-irradiated SiC/SiC composites using Raman spectroscopy." *Journal of Nuclear Materials* 526 (2019): 151778.

S. Agarwal, G. Duscher, **Y. Zhao**, M. L. Crespillo, Y. Katoh, and W. J. Weber. "Multiscale characterization of irradiation behaviour of ion-irradiated SiC/SiC composites." *Acta Materialia* 161 (2018): 207-220.

Y. Zhao, S. Levine, C. Pareige, A. Bhattacharya, Z. Jiao, and S. J. Zinkle. “APT Cluster Analysis Using Open Source Programs”, Paper in process.

Y. Zhao, A. Bhattacharya, J. D. Poplawsky, J. Henry, and S. J. Zinkle. “The depth dependent alpha prime precipitate distribution in Fe18Cr after ion irradiations”, Paper in progress

Y. Zhao, P. Zhu, J. D. Poplawsky, J. Henry, and S. J. Zinkle. “Determining the phase boundary between α and $\alpha+\alpha'$ at low-temperatures with proton irradiations and APT”, Paper in progress

Technical reports

Y. Zhao, S. Zinkle, A. Bhattacharya “Effect of ion irradiation on phase stability in Fe-12%Cr and Fe-14%Cr”, U.S. DOE Office of Fusion Energy Science, Fusion Materials, Semiannual Progress Report, DOE-ER-0313/70 (2021) 131-135.

Y. Zhao, S. Zinkle, P. Zhu, A. Bhattacharya, J. Henry “The evolution of alpha-prime (α') precipitates in high purity Fe-(10-18)Cr alloys after thermal aging and ion irradiations”, U.S. DOE Office of Fusion Energy Science, Fusion Materials, Semiannual Progress Report, DOE-ER-0313/69 (2020) 12-19.

Y. Zhao, S. Zinkle, A. Bhattacharya, J. Henry “A study on the stability of alpha-prime (α') precipitates in high purity Fe-18Cr alloys after ion irradiation”, U.S. DOE Office of Fusion Energy Science, Fusion Materials, Semiannual Progress Report, DOE-ER-0313/67 (2019) 33-37.

Y. Zhao, S. Zinkle, A. Bhattacharya “Alpha-prime (α') precipitate formation in ion irradiated Fe14Cr and Fe18Cr alloys”, U.S. DOE Office of Fusion Energy Science, Fusion Materials, Semiannual Progress Report, DOE-ER-0313/66 (2019) 3-8.

Y. Zhao, S. Zinkle, A. Bhattacharya “Alpha-prime (α') precipitate formation in ion irradiated Fe18Cr alloys”, U.S. DOE Office of Fusion Energy Science, Fusion Materials, Semiannual Progress Report, DOE-ER-0313/65 (2018) 74-77.