

william bowman

Ph.D., materials science & engineering

arizona state university, tempe, arizona, usa

willbowman35@gmail.com | wills-website.com

experience

2012 – 2016

Ph.D. Research Assistant | Crozier Group, Arizona State University

2015 – 2016

Visiting Ph.D. Research Assistant | Electrochemical Materials Group (J.L.M. Rupp), ETH Zürich

2012 – 2016

Graduate Research Fellow | US National Science Foundation, GRFP

education

2016

Ph.D. materials science & engineering | Arizona State University (Advisor: Peter Crozier)

Correlating Nanoscale Grain Boundary Composition with Electrical Conductivity in Ceria

2012

B.S.E. materials science & engineering | Arizona State University

skills

experimental
techniques

transmission electron microscopy (TEM), electron energy-loss spectroscopy (EELS); scanning EM (SEM); energy-dispersive x-ray spectroscopy; XRD; AC impedance spectroscopy

software &
languages

DigitalMicrograph, ImageJ, Inkscape, MS Office, Solidworks, Git, Rails, Python, Matlab, Ruby, HTML, CSS, Javascript, English (native speaker)

references

Prof. Peter A. Crozier | crozier@asu.edu

Prof. Jennifer L.M. Rupp | jennifer.rupp@mat.ethz.ch

publications

in preparation
(2016)

Determining grain boundary conductivity in ceria via scanning transmission electron microscopy

W.J.B., A. Darbal & P.A. Crozier

submitted
(2016)

Enhanced Ionic Conductivity in Electroceramics by Control of Grain Boundary Composition

W.J.B., M.N. Kelly, G.S. Rohrer, C.A. Hernandez & P.A. Crozier

under review
(2016)

Designing Strained Interface Heterostructures for Resistive Switching Devices

S. Schweiger, R. Pfenninger, W.J.B., U. Aschauer & J.L.M. Rupp

Nanoscale
8 16499 (2016)

Coupling of strain, stress, and oxygen non-stoichiometry in thin film $\text{Pr}_{0.1}\text{Ce}_{0.9}\text{O}_{2-\delta}$

J. Sheth, D. Chen, J.J. Kim, W.J.B., P.A. Crozier, H.L. Tuller, S.T. Misture, S. Zdzieszynski, B.W. Sheldon & S.R. Bishop

Ultramicroscopy
167 5-10 (2016)

Measuring band-gap states in individual nonstoichiometric oxide nanoparticles: The praseodymium-ceria case

W.J.B., K. March, C.A. Hernandez & P.A. Crozier

Solid State Ionics
272 9-17 (2015)

Electrical conductivity and grain boundary characterization of Gd-doped and Gd/Pr co-doped ceria electrolytes

W.J.B., J. Zhu, R. Sharma & P.A. Crozier

seminars & invited talks

CIME seminar
EPFL, Lausanne,
Switzerland
2016

Correlative Electron Microscopy across Length Scales to Elucidate Grain Boundary Transport in Non-Stoichiometric Oxides

selected contributed talks

* reviewed conference papers

- Microscopy & Microanalysis**
Columbus, OH
2016
- * **Bandgap State Mapping via Valence-Loss EELS at Grain Boundaries in Non-Stoichiometric $\text{Pr}_x\text{Ce}_{1-x}\text{O}_{2-\delta}$**
W.J.B., March, K., Aoki, T., Sediva, E., Rupp, J.L.M., & Crozier, P.A.
- Microscopy & Microanalysis**
Portland, OR
2015
- * **Grain Boundaries across Length Scales; Correlating SEM, Aberration-Corrected TEM Orientation Imaging and Nanospectroscopy**
W.J.B., Darbal, A.D., Kelly, M., Rohrer, G.S., Hernandez, C.H., McGuinness, K., Crozier, P. A.
- * **Observation of Inter-Bandgap States in Doped Ceria via Monochromated EELS**
W.J.B., March, K., Aoki, T., Hernandez, C.A., Crozier, P.A.
- Mat. Res. Soc.**
San Francisco
2015
- Application of low-loss ultra-high energy resolution EELS to doped CeO_2**
W.J.B., Aoki, T., Rez, P., Crozier, P.A.
- Microscopy & Microanalysis**
Hartford, CT
2014
- * **Nanocharacterization and electrical properties of grain boundaries in Gd/Pr doubly-doped ceria**
W.J.B., Zhu, J., Crozier, P.A.
- Int'l Microscopy Congress**
Prague, CZ
2014
- * **Oxygen Vacancies at Grain Boundaries in Doubly-Doped Ceria Determined using EELS**
W.J.B., Zhu, J., Hussaini, Z., Crozier, P.A.
- Materials Research Soc.**
San Francisco
2014
- Monochromated electron energy loss spectroscopy of transition metal-modified grain boundaries in Gd-doped ceria electrolytes**
W.J.B., Crozier, P.A.
- Correlating transition metal-modified grain boundary conductivity with atomic level structure and composition in Gd-doped ceria electrolytes**
W.J.B., Crozier, P.A.

selected posters

* reviewed conference papers

- GRC: Solid State Ceramics**
S. Hadley, MA
2016
- Correlated Electron Microscopy & AC Impedance Studies of Grain Boundaries in Ceria-Based Electroceramics**
W.J.B., Darbal, A.D., Kelly, M., Rohrer, G.S. & Crozier, P. A.
- Microscopy & Microanalysis**
Portland, OR
2015
- * **Quantifying and Correlating the Composition and Conductivity of Grain Boundaries in Ca-doped CeO_2 Electrolytes, an AC-STEM EELS Study**
W.J.B., Hernandez, C.A., McGuinness, K., Crozier, P.A.
- Solid State Ionics**
20
Keystone, CO
2015
- Grain Boundaries across Length Scales; Orientation Imaging and Nanospectroscopy**
W.J.B., Darbal, A., Kelly, M., Rohrer, G.S., March, K., Hernandez, C.A., McGuinness, K., Crozier, P.A.
- Correlating Conductivity and Composition of $\text{Ca}_x\text{Ce}_{1-x}\text{O}_{2-\delta}$ Grain Boundaries via TEM**
W.J.B., Hernandez, C.A., McGuinness, K., McCartney, M.R., Crozier, P.A.
- Materials Research Soc.**
San Francisco
2015
- Combining STEM Orientational Imaging and EELS to Statistically Correlate Grain Boundary Orientation and Composition in Polycrystalline Doped CeO_2 Electrolytes**
W.J.B., Darbal, A., Crozier, P.A.

GRC: Ceramics
S. Hadley, MA
2014

Modification of grain boundary conductivity in polycrystalline doped ceria
W.J.B., Darbal, A., Zhu, J., Crozier, P.A.

**International
Microscopy
Congress**
Prague, CZ
2014

*** Nanocharacterization and Electrical Properties of Grain Boundaries in Gd/Pr Doubly-Doped CeO₂**
W.J.B., Zhu, J., Crozier, P.A.

awards & recognition

2015 – 2016 **Swiss Government Excellence Scholarship**
9 month visit to ETH Zürich; Swiss Secretariat for Education, Research and Innovation

2012 – 2016 **NSF Graduate Research Fellow**
Support for Ph.D. research activities; US National Science Foundation

2015 **NSF Graduate Research Opportunities Worldwide Award**
Funds for travel and research at ETH Zürich; US National Science Foundation

2015 **Best poster nominee**
Spring meeting; Materials Research Society

2014 **Travel grants for International Microscopy Congress, Prague, CZ**
Awarded by Microscopy Society of America and International Microscopy Congress

2014 **Presidential Scholar Award**
Microscopy Society of America

2014 **Outstanding Graduate Student Award for community outreach**
School for the Engineering of Matter, Transport & Energy, Arizona State University

2012 – 2013 **Doctoral Enrichment Fellowship**
1 year support for Ph.D. research activities; Graduate College, Arizona State University

2011 **NIST Summer Research Fellow**
3 months support for research activities; National Institute of Standards and Technology

mentorship, service & miscellanea

2016 – 2017 **Program Chairperson**
Inaugural Student & Early-Career Pre-Meeting, Microscopy Society of America

2014 – 2016 **Seminar Chairperson**
2016 Gordon Research Seminar: Solid State Studies in Ceramics

2013 – 2016 **Undergraduate student mentor**
SHADES multicultural mentorship program, Arizona State University

2015 **Collection management website development**
Designed, built and deployed web application (fransdollcareandrepair.com)

2013 – 2014 **Outreach Chairperson & founding member**
Electrochemical Society graduate student chapter, Arizona State University

2013 **US National Science Foundation Research Collaborative Network participant**
Visited Ghana to develop international research collaboration with Ghanaian researchers

online

group website | crozier.faculty.asu.edu

GitHub | github.com/willjbowman