

CURRICULUM VITAE

JAMIESON BRECHTL

Oak Ridge National Laboratory

EDUCATION

Doctor of Philosophy, Energy Science and Engineering, 2019

University of Tennessee, Knoxville, TN

Advisor: Professor Steven J. Zinkle

Dissertation: Effects of Irradiation and Annealing on the Properties and Microstructure of Bulk Amorphous Alloys.

Master of Science, Nuclear Engineering and Engineering Physics, 2012

University of Wisconsin-Madison, Madison, WI

Advisors: Professors Todd R. Allen and Kumar Sridharan

Thesis: Development of Diffusion Barrier Coatings and Deposition Technologies for Mitigating Fuel Cladding Chemical Interactions.

Bachelor of Science, Nuclear Engineering, 2011

Additional Majors in Applied Mathematics & Physics

University of Wisconsin-Madison, Madison, WI

PROFESSIONAL EXPERIENCE

Buildings and Transportation Science Division | Oak Ridge, TN

Associate R&D Staff Member – Oak Ridge National Laboratory | 02/2023 – Present

Buildings and Transportation Science Division | Oak Ridge, TN

Postdoctoral Research Associate – Oak Ridge National Laboratory | 06/2019 – 01/2023

Bredesen Center for Interdisciplinary Research and Graduate Education | Knoxville, TN

Graduate Research Assistant – University of Tennessee | 02/2014 – 06/2019

Department of Nuclear Engineering and Engineering Physics, Madison WI

Graduate Research Assistant – University of Wisconsin-Madison | 05/2011 – 09/2012

AWARDS

1. 2024 R&D 100 Award
2. Metals 2021 Highly Cited Paper Award (1st place)
3. 2019 UTK Chancellor's Citation for Extraordinary Professional Promise.
4. 2012 Nuclear Fuels and Structural Materials Best Student Poster Award.

SOCIETY MEMBERSHIPS

1. The Minerals, Metals & Materials Society (TMS)

PATENTS

1. J. D. Rendall, K. Nawaz, W. E. Asher, A. F. Elatar, J. Sun, **J. Brechtl**, X. Liu, K. An, M. Zhang, Density Controlled Phase-Changing Material (PCM) Spheres for Increased Heating Power and Optimal Delivery Temperature in Hot-Water Tanks, US Patent App. 17/890,791.

BOOKS

1. **J. Brechtl**, P.K. Liaw, (Eds.), High-Entropy Materials: Theory, Experiments, and Applications, Springer International Publishing, 2022.

BOOK CHAPTERS

1. M.A. Khan, **J. Brechtl**, High-entropy alloys as an irradiation-resistant material: A review, in: G. Yasin, M.A. Khan, M.A. Afifi, T.A. Nguyen, Y. Zhang (Eds.), High-Entropy Alloys Design, Manufacturing, and Emerging Applications, Elsevier, 2024: pp. 323-374.
2. M.A. Lebyodkin, T.A. Lebedkina, **J. Brechtl**, P.K. Liaw, Serrated Flow in Alloy Systems, in: **J. Brechtl**, P.K. Liaw (Eds.), High-Entropy Materials: Theory, Experiments, and Applications, Springer International Publishing, Cham, 2022: pp. 523-644.
3. Y. Shang, **J. Brechtl**, C. Pistidda, P.K. Liaw, Mechanical Behavior of High-Entropy Alloys: A Review, in: **J. Brechtl**, P.K. Liaw (Eds.), High-Entropy Materials: Theory, Experiments, and Applications, Springer International Publishing, Cham, 2022: pp. 435-522.

JOURNAL PUBLICATIONS

1. M.A. Afifi, M. Hamdy, **J. Brechtl**, M.A. Khan, I.S. Fahim, Enhancing mechanical properties of Al-Zn-Mg-Cu Alloys: The impact of high strain rate compression and subsequent heat treatment on microstructural evolution, Materials Today Communications, *accepted, in press*.
2. M.A. Khan, A. Mansoor, M.A. Hafeez, **J. Brechtl**, M. Zulfiqar, H.M.R. Tariq, M.A. Hussain, A. Farooq, M. Kamran, M.U. Manzoor, U.M. Chaudry, M.A. Afifi, B. Jabar, Evolution of microstructure, texture, and mechanical performance of Mg-13Gd-2Er-0.3Zr alloy by double extrusion at different temperatures, Archive of Civil and Mechanical Engineering, *accepted, in press*.
3. **J. Brechtl**, M. Moses-DeBusk, Y.-R. Lin, T. Lowe, J. Keiser, M.S. Kesler, K. Nawaz, Corrosion behavior of a reactive bond between stainless steel and a cast AlCeMg alloy, International Journal of Metalcasting, *accepted, in press*.
4. **J. Brechtl**, M.C. Martinez, B. Yoon, J. Cesarano, E. Lara-Curzio, K. Nawaz, Thermal shock resistance of additively manufactured alumina, International Journal of Applied Ceramic Technology, *accepted, in press*.
5. J.J. Wang, H.X. Guo, Z.M. Jiao, D. Zhao, X.Z. Chen, S.G. Ma, T.W. Zhang, X.H. Liu, G. Sha, J.W. Qiao, **J. Brechtl**, P.K. Liaw, Z.H. Wang, Coupling effects of temperature and strain rate on the mechanical behavior and microstructure evolution of a powder-plasma-arc additive manufactured high-entropy alloy with multi-heterogeneous microstructures, Acta Mater. 276 (2024).
6. M.A. Khan, **J. Brechtl**, M. Hamza, C. Feng, A. Mansoor, B. Jabar, P.K. Liaw, M.A. Afifi, Influence of high-strain-rate compression and subsequent heat treatment on (TiNbZr)₈₉(AlTa)₁₁ refractory high-entropy alloys: Dynamic-mechanical behavior and microstructural changes, Materials & Design (2024) 113062.
7. K. An, K. Li, C.M. Yang, **J. Brechtl**, D. Stamberg, M. Zhang, K. Nawaz, Direct air capture with amino acid solvent: Operational optimization using a crossflow air-liquid contactor, AIChE Journal

(2024) e18429.

8. K. An, **J. Brechtl**, S. Kowalski, C.-M. Yang, M.K. Kidder, C. Tsouris, C. Janke, M. Lamm, K. Copenhaver, J. Thompson, T. Turnaoglu, B. Fricke, K. Li, X. Sun, K. Nawaz, A multifunctional rooftop unit for direct air capture, *Environmental Science: Advances* 3(6) (2024) 937-949.
9. **J. Brechtl**, A.M. Ullman, K. Li, G. Yang, J. Nanda, K. Nawaz, R.L. Sacchi, Phase change electrolytes for combined electrochemical and thermal energy storage, *Energy Rep.* 11 (2024) 3931–3940.
10. S. Dai, L. Liao, Y. Feng, W. Yao, Y. Cai, **J. Brechtl**, M.A. Afifi, M.A. Khan, R. Zhiying, J. Li, Investigation on microstructures, mechanical properties, and corrosion behavior of novel biodegradable Zn-xCu-xTi alloys after hot rolling fabricated by self-developed newly gradient continuous casting, *J. Mater. Res. Technol.* 30 (2024) 1426–1435
11. **J. Brechtl**, J. Rendall, M. Zhang, M.R. Koehler, K. Nawaz, A.M. Momen, Compatibility of $\text{LaFe}_{13-x-y}\text{Mn}_x\text{Si}_y\text{H}_{1.6}$ and eutectic liquid GaInSn alloy, *Magnetochemistry* 10(2) (2024) 13.
12. S. Yin, Z. Wang, **J. Brechtl**, H. Zhang, M. Zhang, J. Han, Z. Wang, J. Qiao, Shear band velocity and activation volume during shear deformation by acoustic emission in a Zr-based bulk metallic glass, *Journal of Non-Crystalline Solids* 625 (2024) 122767.
13. S. San, P. Adhikari, R. Sakidja, **J. Brechtl**, P.K. Liaw, W.-Y. Ching, Porosity modeling in a TiNbTaZrMo high-entropy alloy for biomedical applications, *RSC advances* 13(51) (2023) 36468-36476.
14. M. Lebyodkin, **J. Brechtl**, T. Lebedkina, K. Wen, P.K. Liaw, T. Shen, Scaling and complexity of stress fluctuations associated with smooth and jerky flow in FeCoNiTiAl high-entropy alloy, *Metals* 13(10) (2023) 1770.
15. K. An, K. Li, C.-M. Yang, **J. Brechtl**, K. Nawaz, A comprehensive review on regeneration strategies for direct air capture, *Journal of CO₂ Utilization* 76 (2023) 102587.
16. M.A. Khan, M. Hamza, **J. Brechtl**, Z. Nazir, N.A. Qaisrani, G. Yasin, T. Ahmad, W.-B. Liao, P.K. Liaw, M.A. Afifi, Development and characterization of a low-density TiNbZrAlTa refractory high entropy alloy with enhanced compressive strength and plasticity, *Materials Characterization* (2023) 113301.
17. **J. Brechtl**, X. Xie, R. Feng, G. Wang, C. Melcher, M. Zhuravleva, P. K. Liaw, Serrated flow in NaI:Tl scintillator crystals, *Journal of Materials Science & Technology*, 153 (2023) 120–127.
18. J. Sun, K. Nawaz, J. Rendall, A. Elatar, **J. Brechtl**, Heat pump water heater enhanced with phase change materials thermal energy storage: Modeling study, *International Communications in Heat and Mass Transfer* 146 (2023) 106917.
19. J. Rendall, **J. Brechtl**, K. Nawaz, A. Elatar, J. Sun, K. An, X. Liu, W. Asher, Experimental results of embedded phase change material capsules for increasing the performance of a wrapped heat pump water heater, *International Communications in Heat and Mass Transfer* 145 (2023) 106806.
20. **J. Brechtl**, R. Feng, P.K. Liaw, B. Beausir, H. Jaber, T. Lebedkina, M. Lebyodkin, Mesoscopic-scale complexity in macroscopically-uniform plastic flow of an $\text{Al}_{0.3}\text{CoCrFeNi}$ high-entropy alloy, *Acta Mater.* 242 (2023) 118445.
21. W. Li, B. Wang, X. Huang, B. Liu, **J. Brechtl**, P.K. Liaw, Mechanical behavior and shear band of a powder-metallurgy-fabricated CoCrFeMnNi high-entropy alloy during high strain-rate deformation, *J. Mater. Res. Technol.* 21 (2022) 1461–1478.
22. Y. Li, W.-B. Liao, H. Chen, **J. Brechtl**, W. Song, W. Yin, Z. He, P.K. Liaw, Y. Zhang, A low-density high-entropy dual-phase alloy with hierarchical structure and exceptional specific yield strength, *Science China Materials* (2022) 1-13.
23. W.-R. Zhang, W.-B. Liao, P.K. Liaw, J.-L. Ren, **J. Brechtl**, Y. Zhang, Effects of transient thermal shock on the microstructures and corrosion properties of a reduced activation high-entropy alloy, *Journal of Alloys and Compounds*, 918 (2022) 165762.

24. J. Moon, E. Tabachnikova, S. Shumilin, T. Hryhorova, Y. Estrin, **J. Brechtel**, P.K. Liaw, W. Wang, K.A. Dahmen, A. Zargaran, J.W. Bae, H.-S. Do, B.-J. Lee, H.S. Kim, Deformation behavior of a Co-Cr-Fe-Ni-Mo medium-entropy alloy at extremely low temperatures, *Materials Today*. 50 (2021) 55–68.
25. **J. Brechtel**, M.R. Koehler, M.S. Kesler, H.B. Henderson, A.A. Baker, K. Li, J. Kiggans, K. Nawaz, O. Rios, A.M. Momen, Effect of composition on the phase structure and magnetic properties of ball-milled $\text{LaFe}_{11.71-x}\text{Mn}_x\text{Si}_{1.29}\text{H}_{1.6}$ magnetocaloric powders, *Magnetochemistry* 7(9) (2021) 132.
26. R.J. Lane, A.M. Momen, M.S. Kesler, **J. Brechtel**, O. Rios, K. Nawaz, R. Mirzaeifar, Developing an experimental-computational framework to investigate the deformation mechanisms and mechanical properties of Al-8Ce-10Mg alloys at micro and macroscales, *Materials Today Communications* 28 (2021) 102674.
27. J. Cheng, R. Lane, M.S. Kesler, **J. Brechtel**, X. Hu, R. Mirzaeifar, O. Rios, A.M. Momen, K. Nawaz, Experiment and non-local crystal plasticity finite element study of nanoindentation on Al-8Ce-10Mg alloy, *International Journal of Solids and Structures* 233 (2021) 111233.
28. J. Moon, E. Tabachnikova, S. Shumilin, T. Hryhorova, Y. Estrin, **J. Brechtel**, P.K. Liaw, W. Wang, K.A. Dahmen, H.S. Kim, Unraveling the discontinuous plastic flow of a Co-Cr-Fe-Ni-Mo multiprincipal-element alloy at deep cryogenic temperatures, *Physical Review Materials* 5(8) (2021) 083601.
29. **J. Brechtel**, Y. Li, K. Li, L. Kearney, K. Nawaz, A. Flores-Betancourt, M. Thompson, O. Rios, A.M. Momen, Structural, Thermal, and Mechanical Characterization of a Thermally Conductive Polymer Composite for Heat Exchanger Applications, *Polymers* 13(12) (2021) 1970.
30. C. Lee, **J. Brechtel**, P. K. Liaw, Research on bulk-metallic glasses and high-entropy alloys in Peter K. Liaw's group and with his colleagues. *Metallurgical and Materials Transactions A*, (2021).
31. N. Hua, W. Wang, Q. Wang, Y. Ye, S. Lin, L. Zhang, Q. Guo, **J. Brechtel**, P.K. Liaw, Mechanical, corrosion, and wear properties of biomedical Ti–Zr–Nb–Ta–Mo high entropy alloys, *Journal of Alloys and Compounds* 861 (2021) 157997.
32. **J. Brechtel**, S. Agarwal, X. Hu, D. Chen, M. Chancey, H. Bei, Y.Q. Wang, S.J. Zinkle, An exploratory study on helium mobility in amorphous and crystallized bulk metallic glasses, *J. Nucl. Mater.* 543 (2021) 152617.
33. C. Lee, Y. Chou, G. Kim, M.C. Gao, K. An, **J. Brechtel**, C. Zhang, W. Chen, J.D. Poplawsky, G. Song, Y. Ren, Y.-C. Chou, P.K. Liaw, Lattice-Distortion-Enhanced Yield Strength in a Refractory High-Entropy Alloy, *Advanced Materials* 32(49) (2020) 2004029.
34. N. Hua, X. Hong, Z. Liao, Q. Wang, L. Zhang, Q. Guo, X. Ye, **J. Brechtel**, P.K. Liaw, A biocompatible Pd-based BMG with excellent corrosive-wear resistance for implant applications, *Intermetallics* 124 (2020) 106847.
35. **J. Brechtel**, S. Chen, C. Lee, Y. Shi, R. Feng, X. Xie, D. Hamblin, A.M. Coleman, B. Straka, H. Shortt, R.J. Spurling, P.K. Liaw, A review of the serrated-flow phenomenon and its role in the deformation behavior of high-entropy alloys, *Metals* 10(8) (2020) 1101.
36. W.-Y. Ching, S. San, **J. Brechtel**, R. Sakidja, M. Zhang, P.K. Liaw, Fundamental electronic structure and multiatomic bonding in 13 biocompatible high-entropy alloys, *npj Computational Materials* 6(1) (2020) 45.
37. B. Zhang, P.K. Liaw, **J. Brechtel**, J. Ren, X. Guo, Y. Zhang, Effects of Cu and Zn on microstructures and mechanical behavior of the medium-entropy aluminum alloy, *Journal of Alloys and Compounds* 820 (2020) 153092.
38. X. Yue, **J. Brechtel**, F. Wang, Z. Chang, P.K. Liaw, C. Fan, Deformation behavior of annealed $\text{Cu}_{64}\text{Zr}_{36}$ metallic glass via molecular dynamics simulations, *Materials & Design* 191 (2020) 108660.

39. **J. Brechtl**, M.L. Crespillo, S. Agarwal, H. Bei, S.J. Zinkle, Effects of irradiation spectrum on the microstructural and mechanical properties of bulk metallic glasses, *J. Nucl. Mater.* 533 (2020) 152084.
40. J. Wen, H. Che, R. Cao, H. Dong, Y. Ye, H. Zhang, **J. Brechtl**, Y. Gao, P.K. Liaw, Evolution of the mechanical properties of a cobalt-based alloy under thermal shocks, *Materials & Design* 188 (2020) 108425.
41. N. Hua, Z. Liao, Q. Wang, L. Zhang, Y. Ye, **J. Brechtl**, P.K. Liaw, Effects of crystallization on mechanical behavior and corrosion performance of a ductile $Zr_{68}Al_8Ni_8Cu_{16}$ bulk metallic glass, *Journal of Non-Crystalline Solids* 529 (2020) 119782.
42. **J. Brechtl**, X. Xie, Z. Wang, J. Qiao, P.K. Liaw, Complexity analysis of serrated flows in a bulk metallic glass under constrained and unconstrained conditions, *Materials Science and Engineering: A* 771 (2020) 138585.
43. **J. Brechtl**, Z. Wang, X. Xie, J.-W. Qiao, P.K. Liaw, Relation between the defect interactions and the serration dynamics in a Zr-based bulk metallic glass, *Applied Sciences* 10(11) (2020) 3892.
44. **J. Brechtl**, S. Agarwal, M.L. Crespillo, J. Salasin, T. Yang, H. Bei, S.J. Zinkle, Investigation of the mechanical and microstructural evolution of a Cu based bulk metallic glass during ion irradiation, *Intermetallics* 116 (2020) 106655.
45. **J. Brechtl**, H. Wang, H. Bei, J. Neufeind, W. Dmowski, S. J. Zinkle, Investigation of the thermal and neutron irradiation response of BAM-11 bulk metallic glass, *J. Nucl. Mater.* 526 (2019) 151771.
46. **J. Brechtl**, S. Agarwal, M. L. Crespillo, T. Yang, H. Bei, Y. Zhang, S. J. Zinkle, Evolution of the microstructural and mechanical properties of BAM-11 bulk metallic glass during ion irradiation and annealing, *J. Nucl. Mater.* 523 (2019) 299-309.
47. **J. Brechtl**, X. Xie, P.K. Liaw, Investigation of chaos and memory effects in the Bonhoeffer-van der Pol oscillator with a non-ideal capacitor, *Commun. Nonlinear Sci. Numer. Simul.* 73 (2019) 195-216.
48. **J. Brechtl**, B. Chen, X. Xie, Y. Ren, J.D. Venable, P.K. Liaw, S.J. Zinkle, Entropy modeling on serrated flows in carburized steels, *Materials Science and Engineering: A* 753 (2019) 135-145.
49. **J. Brechtl**, S.Y. Chen, X. Xie, Y. Ren, J.W. Qiao, P.K. Liaw, S.J. Zinkle, Towards a greater understanding of serrated flows in an Al-containing high-entropy-based alloy, *International Journal of Plasticity* 115 (2019) 71-92.
50. C. Lee, G. Song, M.C. Gao, R. Feng, P. Chen, **J. Brechtl**, Y. Chen, K. An, W. Guo, J.D. Poplawsky, S. Li, A.T. Samaei, W. Chen, A. Hu, H. Choo, P.K. Liaw, Lattice distortion in a strong and ductile refractory high-entropy alloy, *Acta Mater.* 160 (2018) 158-172.
51. **J. Brechtl**, X. Xie, P.K. Liaw, S.J. Zinkle, Complexity modeling and analysis of chaos and other fluctuating phenomena, *Chaos, Solitons & Fractals* 116 (2018) 166-175.
52. S. Chen, X. Xie, W. Li, **J. Brechtl**, P. Li, G. Zhao, F. Yang, J. Qiao, and P. K. Liaw, Nanoscale serration and creep characteristics of $Al_{0.5}CoCrCuFeNi$ high-entropy alloys, *Journal of Alloys and Compounds*, 752 (2018) 464-475.
53. Y. Shi, B. Yang, X. Xie, **J. Brechtl**, K.A. Dahmen, P.K. Liaw, Corrosion of $Al_xCoCrFeNi$ high-entropy alloys: Al-content and potential scan-rate dependent pitting behavior, *Corros. Sci.* 119 (2017) 33-45.
54. V. Firouzdar, **J. Brechtl**, L. Wilson, B. Semerau, K. Sridharan, and T.R. Allen, Development of titanium diffusion barrier coatings for mitigation of fuel-cladding chemical interactions, *Surface and Coatings Technology* 219 (2013): 59-68.
55. V. Firouzdar, **J. Brechtl**, B. Hauch, K. Sridharan, and T. R. Allen, Electrophoretic deposition of diffusion barrier titanium oxide coatings for nuclear reactor cladding applications, *Applied Surface Science* 282 (2013): 798-808.
56. V. Firouzdar, **J. Brechtl**, L. Wilson, B. Semerau, K. Sridharan, and T. R. Allen, Development of yttrium stabilized zirconia (YSZ) diffusion barrier coatings for mitigation of fuel-cladding chemical interactions, *Journal of Nuclear Materials* 438, no. 1 (2013): 268-277.

EDITORIALS

1. **J. Brechtl**, C. Lee, P.K. Liaw, High-entropy materials: Fundamentals and applications, *Journal of Materials Research and Technology*, 23 (2023) 5967–5971.

CONFERENCE PAPERS

1. M. Malhotra, E. Krishnan, J. Rendall, F. Casey, Y. Li, K. Nawaz, J. Sun, **J. Brechtl**, W. Worek, G. Klein, Cost Reduction of Heat Pump Water Heating in Cold Climates for Low to Moderate Income Families, 8th International High Performance Buildings Conference at Purdue - West Lafayette, Indiana, United States of America, 2024, p. Medium: ED.
2. M. Muneeshwaran, C.-M. Yang, **J. Brechtl**, K. Nawaz, Microchannel Geometries for Improved Heat Transfer with Low-GWP refrigerants, 20th International Refrigeration and Air Conditioning Conference at Purdue - West Lafayette, Indiana, United States of America, 2024, p. Medium: ED.
3. E. Krishnan, M. Muneeshwaran, J. Rendall, K. Nawaz, **J. Brechtl**, Performance Evaluation of Drain Water Heat Recovery Exchangers for Heat Pump Water Heaters, 20th International Refrigeration and Air Conditioning Conference at Purdue - West Lafayette, Indiana, United States of America, 2024, p. Medium: ED.
4. Z. Gao, **J. Brechtl**, K. Nawaz, B. Fricke, K. Gluesenkamp, N. Lavrik, P. Boudreaux, K. Li, Advanced frost sensor for HVAC applications, *ASHRAE Transactions*, 2024.
5. J. Rendall, K. Nawaz, K. An, M. Malhotra, F. Casey, W. Worek, Y. Li, J. Sun, A. Elatar, T. Rooney, G. Klein, **J. Brechtl**, Heat pump water heating for multifamily buildings in cold climates to reduce the energy burden for residents with low to moderate incomes, *ASHRAE Transactions*, 2024.
6. J. Sun, K. Nawaz, J. Rendall, A. Elatar, **J. Brechtl**, Model-based co-simulation of heat pump water heater with phase change materials thermal energy storage, 19th International Refrigeration and Air Conditioning Conference - West Lafayette, Indiana, United States of America, 2022, p. Medium: ED.
7. J. Rendall, K. Nawaz, W. Asher, **J. Brechtl**, A. Elatar, K. Li, C.-M. Yang, J. Sun, A.C. Gehl, Experimental results of density controlled phase change material capsules for increased first hour rating for heat pump water heaters, 19th International Refrigeration and Air Conditioning Conference at Purdue - West Lafayette, Indiana, United States of America, 2022, p. Medium: ED.
8. V. Firouzdar, L. Wilson, K. Sridharan, B. Semerau, B. Hauch, **J. Brechtl**, J. I. Cole, T. R. Allen, Development of diffusion barrier coatings for mitigation of fuel-cladding chemical interactions, *Key Engineering Materials*, vol. 507, pp. 3-7. Trans Tech Publications, 2012.

TECHNICAL REPORTS

1. **J. Brechtl**, R. J. Lane, M. Kesler, K. Nawaz, J. Cheng, X. Hu, R. Mirzaeifar, A. M. Momen. “Al-Ce HX Project: Final Report.”, September 29, 2021, ORNL/TM-2022/2553.
2. J. Rendall, W. Asher, **J. Brechtl**, A. Elatar, J. Sun, K. Nawaz. “FLEX HPWH Alpha Prototype Progress – Third Quarter Report.” June 31, 2021, ORNL/SPR-2021/2156.
3. R. J. Lane, M. S. Kesler, **J. Brechtl**, K. Nawaz, J. Cheng, X. Hu, R. Mirzaeifar, A. M. Momen. “AL-CE CAST HX: Complete Fabrication of the Cast.” September 2, 2020, ORNL/TM-2020/1704.
4. J. Ling, **J. Brechtl**, M. Kesler, O. Rios, K. Nawaz, K. Gluesenkamp, R. Lane, R. Mirzaeifar, A. M. Momen. “AL-CE CAST HX: CFD simulation of the casting process and improve the design /methodology and the results of measuring the mechanical properties.” April 15, 2020, ORNL/TM-2020/1514.
5. J. Ling, **J. Brechtl**, M. S. Kesler, O. Rios, K. Nawaz, K. Gluesenkamp, R. Lane, R. Mirzaeifar, A. M. Momen. “AL-CE HX, Design of the Cast to Fabricate a 1 kW Heat Exchanger.” January 30, 2020,

ORNL/TM-2020/1442.

6. **J. Brechtl**, H. B. Henderson M. S. Kesler, M. Thompson, O. Rios, M. Schroeder, A. M. Momen. "Evaluation of the Performance of a) 10-Stage Mag. Stabilized, b) Multi-Stage Microchannel Regenerators, and c) Sintered Structure." July 12, 2019, ORNL/TM-2019/1244.
7. **J. Brechtl**, M. L. Crespillo, T. Yang, H. Wang, J. Salasin, I. Gussev, L. Mora, Y. Zhang, H. Bei, J. Neufeind, W. Dmowski, T. Egami, M. Lang, and S. J. Zinkle. "Effects of Irradiation and Annealing on the Microstructure and Mechanical Properties of Bulk Metallic Glass Alloys." Fusion Materials Semiannual Progress Report for Period Ending June 30, 2017, DOE/ER- 0313/62, U.S. Department of Energy.
8. **J. Brechtl**, N.A.P. Kiran Kumar, H. Bei, Y., and S. J. Zinkle. "Effects of Ion and Neutron Irradiation on BAM-11 Bulk Metallic Glass", Fusion Materials Semiannual Progress Report for Period Ending June 30, 2015, DOE/ER- 0313/58, U.S. Department of Energy, 223.
9. A.G. Perez-Bergquist, **J. Brechtl**, H. Bei, Y. Zhang, and S. J. Zinkle. "Effects of Ion Irradiation on BAM-11 Bulk Metallic Glass", Fusion Materials Semiannual Progress Report for Period Ending June 30, 2014, DOE/ER- 0313/56, U.S. Department of Energy, 184.

OTHER WORKS

1. **J. Brechtl**, P.K. Liaw, The serrated-flow behavior in high-entropy alloys, arXiv preprint arXiv:2103.14504 (2021).
2. S. J. Zinkle, C. Ang, N. A. P. K. Kumar, C. Li, **J. Brechtl**, H. Bei, Radiation effects in innovative structural materials, Transactions 114 1 (2016) 1219.

CONFERENCE PRESENTATIONS

1. **J. Brechtl**, "Effects of Irradiation and Annealing on the Microstructure and Mechanical Properties of Bulk Metallic Glass Alloys", CMSE 2020: The 9th Global Conference on Materials Science and Engineering; Nov. 2020, online.
2. **J. Brechtl**, X. Xie, S. Chen, C. Lee, Y. Shi, H. Diao, Z. Wang, Y. Ren, J. Qiao, P. K. Liaw, "Modeling and Analysis of Serrated Flows in High Entropy Alloys: Past, Present, and Future", TMS 2020: The Minerals, Metals, and Materials Society; Feb. 2020, San Diego, CA, U.S.A.
3. **J. Brechtl**, X. Xie, S. Chen, H. Diao, Y. Shi, P. K. Liaw, and S. J. Zinkle, "Towards a Greater Understanding of the Serration Behavior in High Entropy Alloys and Bulk Metallic Glasses", MS&T 2016: Materials Science and Technology; Oct. 2018, Columbus, OH, U.S.A.
4. **J. Brechtl**, M. L. Crespillo, S. Agarwal, H. Wang, D. Chen, M. Chancey, T. Yang, L. Mora, Y. Zhang, H. Bei, Y. Wang, J. Neufeind, W. Dmowski, T. Egami, P. K. Liaw, and S. J. Zinkle, "Effects of Annealing and Irradiation on the Mechanical and Microstructural Properties of Bulk Metallic Glass Alloys", TMS 2018: The Minerals, Metals, and Materials Society; Mar. 2018, Phoenix, AZ, U.S.A.
5. **J. Brechtl**, X. Xie, S. Chen, H. Diao, B. Chen, Y. Shi, K. A. Dahmen, P. K. Liaw, and S. J. Zinkle, "A Comprehensive Modeling and Analysis of the Serration Behavior in High Entropy Alloys and Other Materials Systems", TMS 2018: The Minerals, Metals, and Materials Society; Mar. 2018, Phoenix, AZ, U.S.A.
6. **J. Brechtl**, H. Bei, and S. J. Zinkle, "Effects of Ion Irradiation on the Mechanical and Microstructural Properties of Two Different Bulk Metallic Glass Alloys", TMS 2017: The Minerals, Metals, and Materials Society; Mar. 2017, San Diego, CA, U.S.A.
7. **J. Brechtl**, X. Xie, S. Chen, H. Diao, Y. Shi, T. Yang, B. Chen, K. A. Dahmen, P. K. Liaw, and S. J. Zinkle, "A Multifaceted Approach to Analyze the Serration Behavior in High Entropy Alloys and Other Material Systems", TMS 2017: The Minerals, Metals, and Materials Society; Mar. 2017, San Diego,

CA, U.S.A.

8. **J. Brechtl**, X. Xie, S. Chen, H. Diao, Y. Shi, P. K. Liaw, and S. J. Zinkle, “Multiscale Entropy Analysis on the Serrated Flow of Unirradiated and Irradiated Alloy Systems Undergoing Mechanical Testing at Different Strain Rates and Temperatures”, MS&T 2016: Materials Science and Technology; Oct. 2016, Salt Lake City, UT, U.S.A.
9. **J. Brechtl**, X. Xie, P. K. Liaw, and S. J. Zinkle, “Effects of Ion and Neutron Irradiation on the Serration Behavior and Mechanical Properties of $Zr_{52.5}Cu_{17.9}Ni_{14.6}Al_{10}Ti_5$ (BAM-11) Bulk Metallic Glass”, MS&T 2015: Materials Science and Technology; Oct. 2015, Columbus, OH, U.S.A.