

Publications (205) and Citations (11224)
Professor Dr. Ralf Busch
(as of February 1, 2024; H-Index: 55, Google Scholar)

I. Journals [155]:

Gas atomization of fully-amorphous Ni₆₂Nb₃₈ powder

Erika Soares Barreto, Maximilian Frey, Lucas Matthias Ruschel, Jan Wegner, Stefan Kleszczynski, **Ralf Busch**, Nils Ellendt, *Materials Letters* **357**, 135798 (2024).

Differences in structure and dynamics of ternary Pd–Ni-based bulk metallic glasses containing sulfur or phosphorous.

Hendrik Voigt, Nico Neuber, Olivia Vaerst, Maximilian Demming, **Ralf Busch**, Martin Peterlechner, Harald Rösner, Gerhard Wilde, *Acta Materialia*, **264**, 119574 (2024).

Development and optimization of novel sulfur-containing Ti-based bulk metallic glasses and the correlation between primarily crystallizing phases, thermal stability and mechanical properties.

Lucas M Ruschel, Bastian Adam, Oliver Gross, Nico Neuber, Maximilian Frey, Hans-Jürgen Wachter, **Ralf Busch**, *Journal of Alloys and Compounds* **960**, 170614 (2023).

Ni-Nb-P-based bulk glass-forming alloys: Superior material properties combined in one alloy family.

Lucas M Ruschel, Oliver Gross, Benedikt Bochtler, Bosong Li, Bastian Adam, Nico Neuber, Maximilian Frey, Sergej Jakovlev, Fan Yang, Hao-Ran Jiang, Bernd Gludovatz, Jamie J Kruzic, **Ralf Busch**, *Acta Materialia* **253**, 118968 (2023). (2)

Influence of sulfur addition on the glass formation, phase transformation and mechanical properties of Cu₅₀Zr₅₀ alloy.

Hao-Ran Jiang, Jing-Yi Hu, Nico Neuber, Maximilian Frey, Lin-zhi Xu, Kang Sun, Yan-Dong Jia, Gang Wang, **Ralf Busch**, Jun Shen, *Acta Materialia*, **255**, 119064 (2023).

Denser glasses relax faster: Enhanced atomic mobility and anomalous particle displacement under in-situ high pressure compression of metallic glasses.

Antoine Cornet, Gaston Garbarino, Federico Zontone, Yuriy Chushkin, Jeroen Jacobs, Eloi Pineda, Thierry Deschamps, Shubin Li, Alberto Ronca, Jie Shen, Guillaume Morard, Nico Neuber, Maximilian Frey, **Ralf Busch**, Isabella Gallino, Mohamed Mezouar, Gavin Vaughan, Beatrice Ruta, *Acta Materialia* **255**, 119065 (2023). (1)

Electromagnetic levitation containerless processing of metallic materials in microgravity: thermophysical properties.

Markus Mohr, Y Dong, GP Bracker, Robert W Hyers, DM Matson, R Zboray, R Frison, A Dommann, A Neels, X Xiao, J Brillo, **R Busch**, R Novakovic, P Srirangam, H-J Fecht, *npj Microgravity* **9** (1), 34 (2023). (2)

Study on Technical Parameters and Suitability of Platinum-Based Metallic Glasses for Jewellery Applications : Testing a series of platinum-based alloys for novel designs.

LY Schmitt, N Neuber, M Eisenbart, L Cifci, O Gross, UE Klotz, R Busch, Johnson Matthey Technology Review **67**, 317 (2023).

Laser powder bed fusion of Cu-Ti-Zr-Ni bulk metallic glasses in the Vit101 alloy system.

Maximilian Frey, Jan Wegner, Erika Soares Barreto, Lucas Ruschel, Nico Neuber, Bastian Adam, Sascha Sebastian Riegler, Hao-Ran Jiang, Gerd Witt, Nils Ellendt, Volker Uhlenwinkel, Stefan Kleszczynski, **Ralf Busch**, Additive Manufacturing **66**, 103467 (2023). (2)

Influence of oxygen in the production chain of Cu–Ti-based metallic glasses via laser powder bed fusion.

Erika Soares Barreto, Jan Wegner, Maximilian Frey, Stefan Kleszczynski, **Ralf Busch**, Volker Uhlenwinkel, Lutz Mädler, Nils Ellendt, Powder Metallurgy, 1-12 (2023) (<https://doi.org/10.1080/00325899.2023.217920>). (1)

Size-dependent vitrification in metallic glasses.

Valerio Di Lisio, Isabella Gallino, Sascha Riegler, Maximilian Frey, Nico Neuber, Golden Kumar, Jan Schroers, Ralf Busch, Daniele Cangialosi, Nature Communications **14**, 4698 (2023). (3)

Model Metallic Glasses for Superior Electrocatalytic Performance in a Hydrogen Oxidation Reaction.

Chaitanya Mahajan, Vahid Hasannaemi, Nico Neuber, Xiaowei Wang, **Ralf Busch**, Isabella Gallino, Sundeep Mukherjee, ACS Applied Materials & Interfaces **15** (5), 6697-6707 (2023).

Disentangling structural and kinetic components of the α -relaxation in supercooled metallic liquids.

Nico Neuber, Oliver Gross, Maximilian Frey, Benedikt Bochtler, Alexander Kuball, Simon Hechler, Fan Yang, Eloi Pineda, Fabian Westermeier, Michael Sprung, Florian Schäfer, Isabella Gallino, **Ralf Busch**, Beatrice Ruta, Communications Physics **5** (1), 316 (2022). (6)

Solid State Joining of a Cold Rolled Zr-Based Bulk Metallic Glass to a Wrought Aluminum Alloy by Power Ultrasonics.

M Becker, A Kuball, A Ghavimi, B Adam, **R Busch**, I Gallino, F Balle Materials **15** (21), 7673 (2022). (1)

Effect of composition and thermal history on deformation behavior and cluster connections in model bulk metallic glasses.

Nico Neuber, Maryam Sadeghilaridjani, Nandita Ghodki, Oliver Gross, Bastian Adam, Lucas Ruschel, Maximilian Frey, Saideep Muskeri, Malte Blankenburg, Isabella Gallino, **Ralf Busch**, Sundeep Mukherjee, Scientific Reports **12** (1), 17133 (2022). (4)

Determining and modelling a complete time-temperature-transformation diagram for a Pt-based metallic glass former through combination of conventional and fast scanning calorimetry.

M Frey, N Neuber, M Müller, O Gross, SS Riegler, I Gallino, **R Busch**, Scripta Materialia **215**, 114710 (2022). (2)

Material Extrusion of Structural Polymer–Aluminum Joints—Examining Shear Strength, Wetting, Polymer Melt Rheology and Aging.

S Bechtel, R Schweitzer, M Frey, **R Busch**, HG Herrmann, Materials **15** (9), 3120 (2022). (6)

Properties of gas-atomized Cu-Ti-based metallic glass powders for additive manufacturing. ES Barreto, M Frey, J Wegner, A Jose, N Neuber, R Busch, Stefan Kleszczynski, Lutz Mädler, Volker Uhlenwinkel, *Materials & Design* **215**, 110519 (2022). (14)

Selective laser melting of a Fe-Si-Cr-B-C-based complex-shaped amorphous soft-magnetic electric motor rotor with record dimensions.

L Thorsson, M Unosson, MT Pérez-Prado, X Jin, P Tiberto, G Barrera, B. Adam, N. Neuber, A. Ghavimi, M. Frey, **R. Busch**, I. Gallino, *Materials & Design* **215**, 110483 (2021). (20)

On the devitrification of Cu–Zr–Al alloys: Solving the apparent contradiction between polymorphic liquid-liquid transition and phase separation.

HR Jiang, J Tseng, N Neuber, J Barrirero, B Adam, M Frey, AC Dippel, Soham Banerjee, Isabella Gallino, Ai-Han Feng, Gang Wang, Frank Mücklich, **Ralf Busch**, Jun Shen, *Acta Materialia* **226**, 117668 (2022). (10)

Additive manufacturing of a compliant mechanism using Zr-based bulk metallic glass.

Jan Wegner, Maximilian Frey, **Ralf Busch**, Stefan Kleszczynski, *Additive Manufacturing Letters* **1**, 100019 (2021). (7)

On the thermodynamics and its connection to structure in the Pt-Pd-Cu-Ni-P bulk metallic glass forming system.

N Neuber, O Gross, M Frey, B Bochtler, A Kuball, S Hechler, I Gallino, **Ralf Busch**, *Acta Materialia* **220**, 117300 (2021). (16)

Influence of powder characteristics on the structural and the mechanical properties of additively manufactured Zr-based bulk metallic glass. Jan Wegner, Maximilian Frey, Markus Piechotta, Nico Neuber, Bastian Adam, Sebastian Platt, Lucas Ruschel, Norman Schnell, Sascha Sebastian Riegler, Hao-Ran Jiang, Gerd Witt, **Ralf Busch**, Stefan Kleszczynski *Materials & Design* **209**, 109976 (2021). (37)

Changes in the crystallization sequence upon sulfur addition in the $Zr_{52.5}Cu_{17.9}Ni_{14.6}Al_{10}Ti_5$ bulk metallic glass-forming liquid revealed by in situ high-energy x-ray diffraction,

B Bochtler, JM Mariño-Salguero, A Kuball, O Gross, F Yang, A Meyer, Thomas Buslaps, Uta Rütt, **Ralf Busch**, *Physical Review Materials* **5** (10), 103402 (2021). (3)

The effect of shear on the liquid–liquid transition and crystallization of the undercooled $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ (Vit1) bulk metallic glass forming alloy.

I Gallino, P Wadhwa, **R Busch**, *Journal of Physics: Condensed Matter* **33** (47), 474002 (2021). (1)

Ni self-diffusion in glass forming Pd–Ni–S melts.

J Wilden, F Yang, G Günther, M Russina, A Kuball, **R Busch**, A Meyer, *Journal of Physics: Condensed Matter* **33** (43), 435101 (2021). (1)

Influence of Processing Route on the Surface Reactivity of $Cu_{47}Ti_{33}Zr_{11}Ni_6Sn_2Si_1$ Metallic Glass

Erika Soares Barreto, Volker Uhlenwinkel, Maximilian Frey, Isabella Gallino, **Ralf Busch**, Andreas Lüttge, *Metals* **11**, 1173 (2021). (4)

Effect of sulfur on the glass-forming ability, phase transformation, and thermal stability of Cu-Zr-Al bulk metallic glass.

Hao-Ran Jiang, Jing-Yi Hu, Nico Neuber, Benedikt Bochtler, Bastian Adam, Sascha S Riegler, Maximilian Frey, Lucas Ruschel, Wen-Fei Lu, Ai-Han Feng, **Ralf Busch**, Jun Shen, Acta Materialia **212**, 116923 (2021). (15)

Thermoplastic forming of additively manufactured Zr-based bulk metallic glass: A processing route for surface finishing of complex structures.

Maximilian Frey, Jan Wegner, Nico Neuber, Benedikt Reiplinger, Benedikt Bochtler, Bastian Adam, Lucas Ruschel, Sascha Sebastian Riegler, Hao-Ran Jiang, Stefan Kleszczynski, Gerd Witt, **Ralf Busch**, Materials & Design **198**, 109368 (2021). (28)

Thermodynamic and kinetic studies of the Cu–Zr–Al(–Sn) bulk metallic glass-forming system.

HR Jiang, B Bochtler, SS Riegler, XS Wei, N Neuber, M Frey, I Gallino, **R. Busch**, J. Shen, Journal of Alloys and Compounds **844**, 156126 (2020). (25)

Fracture and fatigue behaviour of a laser additive manufactured Zr-based bulk metallic glass.

JP Best, HE Ostergaard, B Li, M Stolpe, F Yang, K Nomoto, MT Hasib, O. Muransky, **R. Busch**, XP Li, JJ Kruzic, Additive Manufacturing, **36**, 101416 (2020). (60)

Wave vector dependence of the dynamics in supercooled metallic liquids.

B. Ruta, S. Hechler, N. Neuber, D. Orsi, L. Cristofolini, O. Gross, B. Bochtler, M. Frey, A. Kuball, S.S. Riegler, M. Stolpe, Z. Evenson, C. Gutt, F. Westermeyer, **R. Busch** and I. Gallino, Physical Review Letters **125**, 055701 (2020). (20)

Impact of Sulfur on the melt dynamics of glass forming Ti75Ni25-xSx.

J. Wilden, F. Yang, D. Holland-Moritz, S. Szabo, W. Lohstroh, B. Bochtler, **R. Busch**, and A. Meyer, Applied Physics Letters **117**, 013702 (2020). (9)

Determining the fragility of bulk metallic glass forming liquids via modulated DSC.

M Frey, N Neuber, O Gross, B Zimmer, W Possart, **R Busch**, Journal of Physics: Condensed Matter **32**, 324004 (2020). (5)

Ultrafast scanning calorimetry of newly developed Au-Ga bulk metallic glasses.

N Neuber, M Frey, O Gross, J Baller, I Gallino, **R Busch**, Journal of Physics: Condensed Matter **32**, 324001 (2020). (8)

Vitrification decoupling from α -relaxation in a metallic glass.

X Monnier, D Cangialosi, B Ruta, **R Busch**, I Gallino, Science Advances **6**, aay1454 (2020). (57)

Bulk metallic glass formation in the (Ti,Zr)–(Ni,Cu)–S system.

O Gross, L Ruschel, A Kuball, B Bochtler, B Adam, **R Busch**, Journal of Physics: Condensed Matter **32**, 264003 (2020). (9)

Thermoplastic forming of amorphous metals.

B Bochtler, O Kruse, **R Busch**, Journal of Physics: Condensed Matter **32**, 244002 (2020). (17)

Equilibrium viscosity and structural change in the $Cu_{47.5}Zr_{45.1}Al_{7.4}$ bulk glass-forming liquid.
HR Jiang, B Bochtler, M Frey, Q Liu, XS Wei, Y Min, SS Riegler, DD Liang, **R. Busch**, J. Shen, Acta Materialia **184**, 69-78 (2020). (20)

Relating fracture toughness to micro-pillar compression response for a laser powder bed additive manufactured bulk metallic glass.

JP Best, J Ast, B Li, M Stolpe, **R Busch**, F Yang, X Li, J Michler, JJ Kruzic, Materials Science and Engineering A **770**, 138535 (2020). (62)

Influence of process gas during powder bed fusion with laser beam of Zr-based bulk metallic glasses

Jan Wegner, Maximilian Frey, Stefan Kleszczynski, **Ralf Busch**, Gerd Witt, Procedia CIRP **94**, 205 (2020). (26)

Mechanical Properties of Honeycomb Structured Zr-based Bulk Metallic Glass Specimens Fabricated by Laser Powder Bed Fusion.

J Wegner, M Frey, P Stiglmair, S Kleszczynski, G Witt, **R Busch**, South African Journal of Industrial Engineering **30**, 32-40 (2019). (19)

Signatures of structural differences in Pt-P- and Pd-P-based bulk glass-forming liquids.

O. Gross, N. Neuber, A. Kuball, B. Bochtler, S. Hechler, M. Frey and **R. Busch**, Communications Physics **2**, 1 (2019). (28)

Development and characterization of titanium-based bulk metallic glasses

A. Kuball, O. Gross, B. Bochtler, B. Adam, L. Ruschel, M. Zamanzade, **R. Busch**, Journal of Alloys and Compounds **790**, 337 (2019). (38)

The role of Ga addition on the thermodynamics, kinetics, and tarnishing properties of the Au Ag Pd Cu Si bulk metallic glass forming system.

N. Neuber, O. Gross, M. Eisenbart, A. Heiss, U. E. Klotz, J. P. Best, M. N. Polyakov, J. Michler, **R. Busch**, I. Gallino, Acta Materialia **165**, 315 (2019). (24)

Ignition in ternary Ru/Al-based reactive multilayers—Effects of chemistry and stacking sequence.

C Pauly, K Woll, I Gallino, M Stüber, H Leiste, **R Busch**, F Mücklich, Journal of Applied Physics **124**, 195301 (2018). (11)

High-temperature rotating cylinder rheometer for studying metallic glass forming liquids.

W. Hembree, B. Bochtler, and **R. Busch**, Review of Scientific Instruments **89**, 113904 (2018). (10)

On the bulk glass formation in the ternary Pd-Ni-S system.

A Kuball, B Bochtler, O Gross, V Pacheco, M Stolpe, S Hechler, **R Busch**, Acta Materialia **158**, 13 (2018). (33)

Microscopic evidence of the connection between liquid-liquid transition and dynamical crossover in an ultraviscous metallic glass former.

S Hechler, B Ruta, M Stolpe, E Pineda, Z Evenson, O Gross, A Bernasconi, **R. Busch**, I. Gallino, *Physical Review Materials* **2**, 085603 (2018). (31)

On the thermodynamics, kinetics, and sub-T_g relaxations of Mg-based bulk metallic glasses.

M Frey, **R Busch**, W Possart, I Gallino, *Acta Materialia*, **155**, 117 (2018). (35)

Industrial grade versus scientific pure: Influence on melt properties.

I Jonas, W Hembree, F Yang, **R Busch**, A Meyer, *Applied Physics Letters* **112**, 171902 (2018). (33)

Analysis of thermophysical properties of lead silicates in comparison to bulk metallic glasses.

S Hechler, I Gallino, M Stolpe, FT Lentjes, **R Busch**, *Journal of Non-Crystalline Solids* **485**, 66 (2018). (3)

Crystallization behavior of the Al₈₆Ni₈Y₆ metallic glass forming alloy upon rapid cooling.

A Kuball, M Stolpe, **R Busch**, *Journal of Alloys and Compounds* **737**, 398 (2018). (13)

Sulfur-bearing Metallic Glasses: A New Family of Bulk Glass-Forming Alloy

A. Kuball, O. Gross, B.Bochtler, **R. Busch**, *Scripta Materialia* **146C**, 73 (2018). (28)

Development of novel 18-karat, premium-white gold bulk metallic glasses with improved tarnishing resistance.

O Gross, M Eisenbart, LY Schmitt, N Neuber, L Ciftci, UE Klotz, **R Busch**, I. Gallino, *Materials & Design* **140**, 495 (2018). (15)

Consolidation of amorphous powder by thermoplastic forming and subsequent mechanical testing.

B Bochtler, M Stolpe, B Reiplinger, **R Busch**, *Materials & Design* **140**, 188 (2018). (29)

Indications for a fragile-to-strong transition in the high- and low-temperature viscosity of the Fe₄₃Cr₁₆Mo₁₆C₁₅B₁₀ bulk metallic glass-forming alloy

B Bochtler, O Gross, **R Busch**, *Applied Physics Letters* **111**, 261902 (2017). (21)

Magnetic small-angle neutron scattering on bulk metallic glasses: a feasibility study for imaging displacement fields

D. Mettus, M. Deckarm, A. Leibner, R. Birringer, Moritz Stolpe, **R. Busch**, D. Honecker, J. Kohlbrecher, P. Hautle, N. Niketic, J. Rodrigues Fernandez, L. Fernandez Barquin, and A. Michels, *Phys.Rev. Materials* **1**, 074403 (2017). (8)

On the high glass-forming ability of Pt-Cu-Ni/Co-P-based liquids

O Gross, SS Riegler, M Stolpe, B Bochtler, A Kuball, S Hechler, **R Busch**, I. Gallino, *Acta Materialia* **141**, 109-119 (2017). (35)

Kinetics, Thermodynamics, and Structure of Bulk Metallic Glass Forming Liquid.

R Busch, I Gallino, *JOM* **69** (11), 2178 (2017). (32)

Relaxation Pathways in Metallic Glasses

I Gallino, **R. Busch**, JOM **69** (11), 2171 (2017). (22)

The kinetic fragility of Pt-P- and Ni-P-based bulk glass-forming liquids and its thermodynamic and structural signature

O Gross, B Bochtler, M Stolpe, S Hechler, W Hembree, **R Busch**, I Gallino, Acta Materialia **132**, 118 (2017). (43)

Structural evolution on medium-range-order during the fragile-strong transition in $Ge_{15}Te_{85}$

S Wei, M Stolpe, O Gross, W Hembree, S Hechler, J Bednarcik, **R Busch**, P. Lucas, Acta Materialia **129**, 259 (2017). (52)

Atomic scale analysis of phase formation and diffusion kinetics in Ag/Al multilayer thin films

H Aboufadel, I Gallino, **R Busch**, F Mücklich, Journal of Applied Physics **120**, 195306 (2016) (22)

Thermo-physical characterization of the $Fe_{67}Mo_6Ni_{3.5}Cr_{3.5}P_{12}C_{5.5}B_{2.5}$ bulk metallic glass forming alloy.

B. Bochtler, O. Gross, I. Gallino, **R. Busch**, Acta Materialia **118**, 129 (2016). (55)

Structural changes during a liquid-liquid transition in the deeply undercooled $Zr_{58.5}Cu_{15.6}Ni_{12.8}Al_{10.3}Nb_{2.8}$ bulk metallic glass-forming melt.

M. Stolpe, I. Jonas, S. Wei, Z. Evenson, W. Hembree, F. Yang, A. Meyer and **R. Busch**, Phys. Rev. B **93**, 014201 (2016). (84)

Electrochemical Dissolution Behavior of Titanium and Titanium-based Alloys in Different Electrolytes.

D Baehre, A Ernst, K Weißhaar, H Natter, M Stolpe, **Ralf Busch**, Procedia CIRP **42**, 137 (2016). (63)

Oxidation of glassy Ni-Nb-Sn alloys and its influence on the thermodynamics and kinetics of crystallization.

S. Stanojevic, I. Gallino, H. Aboufadel, M. Sahin, F. Mücklich, and **R. Busch**, Acta Materialia **102**, 176-186 (2016). (14)

X-Ray Photon Correlation Spectroscopy Reveals Intermittent Aging Dynamics in a Metallic Glass

Z. Evenson, B. Ruta, S. Hechler, M. Stolpe, E. Pineda, I. Gallino, **R. Busch**, Phys. Rev. Lett. **115**, 175701 (2015). (118)

The effect of low-temperature structural relaxation on free volume and chemical short-range ordering in a $Au_{49}Cu_{26.9}Si_{16.3}Ag_{5.5}Pd_{2.3}$ bulk metallic glass.

Z. Evenson, T. Koschine, S. Wei, O. Gross, J. Bednarcik, I. Gallino, J.J. Kruzic, K. Rätzke, F. Faupel, **R. Busch**, Scripta Materialia **103**, 14 (2015). (51)

Linking structure to fragility in bulk metallic glass-forming liquids.

S. Wei, M. Stolpe, O. Gross, Z. Evenson, I. Gallino, J. Bednarcik, J.J. Kruzic and **R. Busch**, J. Appl. Phys. Lett. **106**, 181901 (2015). (56)

Electrochemical dissolution behaviour of $Ti_{90}Al_6V_4$ and $Ti_{60}Al_{40}$ used for ECM applications.

M. Weinmann, M. Stolpe, O. Weber, **R. Busch**, H. Natter, Journal of Solidstate Electrochemistry, **19**, 485 (2015). (61)

On the abnormal room temperature tarnishing of an 18 karat gold bulk metallic glass alloy.

M. Eisenbart, U. E. Klotz, **R. Busch**, and I. Gallino, Journal of Alloys and Compounds **615**, 118, (2014). (15)

On the kinetic and thermodynamic fragility of the $Pt_{60}Cu_{16}Co_2P_{22}$ and $Pt_{57.3}Cu_{14.6}Ni_{5.3}P_{22.8}$ bulk metallic glasses.

I. Gallino, O. Gross, G. Dalla Fontana, Z. Evenson, and **R. Busch**, Journal of Alloys and Compounds **615**, 35 (2014). (17)

The impact of fragility on the calorimetric glass transition in bulk metallic glasses.

S. Wei, Z. Evenson, I. Gallino, **R. Busch**, Intermetallics **55**, 138 (2014). (25)

A colourimetric and microstructural study of the tarnishing of gold-based bulk metallic glasses.

Miriam Eisenbart, Ulrich E Klotz, **Ralf Busch**, Isabella Gallino, Corrosion science **85**, 258 (2014). (20)

β relaxation and low-temperature aging in a Au-based bulk metallic glass: From elastic properties to atomic-scale structure.

Z. Evenson, S.E. Naleway, S. Wei, O. Gross, J.J. Kruzic, I. Gallino, W. Possart, M. Stommel, **R. Busch**, Physical Review B **89** 174204 (2014). (82)

Evolution of shear bands, free volume and hardness during cold rolling of a Zr-based bulk metallic glass.

M. Stolpe, J.J. Kruzic, and **R. Busch**, Acta Materialia **64**, 231 (2014). (132)

Improving participation of engineering students studying abroad: an international dual-degree program in materials science and mechanical engineering.

W.H Warnes, J.J. Kruzic, C.C. Pratt, C. Stehr, D.P. Cann, B.J. Gibbons, I. Gallino, F. Soldera, **R. Busch**, L. Wallström, JOM **65**, 840 (2013). (5)

Liquid-liquid transition in a strong bulk metallic glass-forming liquid

S. Wei, F. Yang, J. Bednarcik, I. Kaban, O. Shuleshova, A. Meyer and **R. Busch**, Nature Communications **4**, art. No. 2083 (2013). (204)

Co-continuous porosity formation on thin oxide films: transition metal oxides ($Ti=2$ and Nb_2O_5) versus SiO_2

S. Stanojevic, A. Ochsenbein, and **R. Busch**, J. Sol-Gel Science and Technology **66**, 518 (2013). (1)

*Errata to: "Equilibrium viscosity, enthalpy recovery and free volume relaxation in a $Zr_{44}Ti_{11}Ni_{10}Cu_{10}Be_{25}$ bulk metallic glass" [Acta Mater 59 (2011) 4404–4415] S. Zach Evenson, and **R. Busch**, Acta Materialia **6**, 2282 (2013).*

Co-continuous morphology on spin coating produced thin TiO₂ films

S. Stanojevic, A. Ochsenein, and **R. Busch**, J. Sol-Gel Science and Technology **64**, 390 (2012). (3)

Oxidation and corrosion of highly alloyed Cu-Fe-Ni as inert anode material for aluminium electrowinning in as-cast and homogenized conditions.

I. Gallino, M.E. Kassner, and **R. Busch**, Corrosion Science, **63**, 293 (2012). (50)

High temperature melt viscosity and fragile to strong transition in Zr-Cu-Ni-Al-Nb(Ti) and Cu₄₇Ti₃₄Zr₁₁Ni₈ bulk metallic glass

Z. Evenson, T. Schmitt, M. Nicola, I. Gallino, **R. Busch**, Acta Mater. **60**, 4712 (2012). (106)

Processing of a bulk metallic glass forming alloy based on industrial grade Zr.

J. Heinrich, **R. Busch**, B. Nonnenmacher, Intermetallics **25**, 1 (2012). (59)

Role of aluminium as an oxygen-scavenger in zirconium based bulk metallic glasses.

J. Heinrich, **R. Busch**, F. Müller, S. Grandthyll, S. Hufner, Appl. Phys. Lett. **100**, 071909 (2012). (25)

Enthalpy recovery and free volume relaxation in a Zr₄₄Ti₁₁Ni₁₀Cu₁₀Be₂₅ bulk metallic glass.

Z. Evenson and **R. Busch**, Journal of Alloys and Compounds **509**, S38-S41 (2011). (24)

Equilibrium viscosity, enthalpy recovery and free volume relaxation in a Zr₄₄Ti₁₁Ni₁₀Cu₁₀Be₂₅ bulk metallic glass.

Z. Evenson and **R. Busch**, Acta Mater. **59**, 4404 (2011). (108)

Fatigue crack growth behavior of a Zr_{58.5}Cu_{15.6}Ni_{12.8}Al_{10.3}Nb_{2.8} bulk metallic glass-forming alloy.

S.L. Philo, J. Heinrich, I. Gallino, and **R. Busch**, and J.J. Kruzic, Scripta Mater. **64**, 359 (2011). (19)

Glass transition with decreasing correlation length during cooling of Fe₅₀Co₅₀ superlattice and strong liquids.

S. Wei, I. Gallino, **R. Busch**, and C.A. Angell, Nature-Physics **7**, 178 (2011). (57)

Investigation of mechanical, corrosion and optical properties of an 18 carat Au-Cu-Si-Ag-Pd bulk metallic glass.

S. Mozgovoy, J. Heinrich, U.E. Klotz, and **R. Busch**, Intermetallics **18**, 2289 (2010). (36)

Kinetic and thermodynamic studies of the fragility of bulk metallic glass forming liquids.

I. Gallino, J. Schroers, and **R. Busch**, J. Appl. Phys. **108**, 063501 (2010). (95)

Equilibrium viscosity of Zr-Cu-Ni-Al-Nb bulk metallic glasses.

Z. Evenson, S. Raedersdorf, I. Gallino, and **R. Busch**, Scripta Mater. **63**, 573 (2010). (54)

The effect of cooling rates on the apparent fragility of Zr-based bulk metallic glasses.

Z. Evenson, I. Gallino, and **R. Busch**, J. Appl. Phys. **107**, 123529 (2010). (65)

Metallurgy beyond iron.

I. Gallino and, **R. Busch**, Publications of the Astronomical Society of Australia **26**, pp. iii-vii (2009).

Improving endothelial cell adhesion and proliferation on titanium by sol-gel derived oxide coating.

F. Chai, A. Ochsenein, M. Traisnel, **R. Busch**, J. Breme, and H.F. Hildebrandt; J. Biomedical Materials Research **92A**, 754 (2010). (37)

Prediction of spinodal wavelength in continuously cooled metallic liquid.

Christine Borchers, Jan Schroers and **R. Busch**, Annalen der Physik **18**, 4 (2009). (7)

Homogenization of highly alloyed Cu-Fe-Ni: A phase diagram study.

I. Gallino, S. Curiotto, M. Baricco, **R. Busch**, and M.E. Kassner, J. Phase Equilibria and Diffusion **29**, 131 (2008). (23)

Effects of free volume changes and residual stresses on the fatigue and fracture behavior of a Zr-Ti-Ni-Cu-Be bulk metallic glass.

M. E. Launey und J. J. Kruzic, **R. Busch**, Acta Mater. **56**, 500 (2008). (177)

Thermodynamics and kinetics of bulk metallic glass.

R. Busch, J. Schroers, and W.H. Wang, MRS Bulletin **32**, 620 (2007). (323)

Quantification of free volume differences in a $Zr_{44}Ti_{11}Ni_{10}Cu_{10}Be_{25}$ bulk amorphous alloy.

M. E. Launey und J. J. Kruzic, C. Li, **R. Busch**, Appl. Phys. Lett. **91**, 051913 (2007). (65)

Shear rate dependence of viscosity and configurational entropy of the $Zr_{41.2}Ti_{13.8}u_{12.5}Ni_{10.0}Be_{22.5}$ metallic glass forming liquid.

C. Way, T. Shaw, P. Wadhwa, and **R. Busch**, Journal of Alloys and Compounds **434-435**, 88 (2007). (13)

High temperature oxidation of the refractory alloy glass $Nb_{65}Ni_{69}Sn_5$.

I. Gallino, **R. Busch**, H. Choi Yim, L. Jastrow, and U. Köster, Journal of Alloys and Compounds **434-435**, 225 (2007). (11)

Synthesis and characterisation of copper fiber reinforced $Zr_{41.2}Ti_{13.8}Cu_{12.2}Ni_{10.0}Be_{22.5}$ bulk metallic glass.

P. Wadhwa, J. Heinrich, and **R. Busch**, Journal of Alloys and Compounds **434-435**, 259 (2007). (5)

Enthalpy relaxation of the $Zr_{58.5}Cu_{15.6}Ni_{12.8}Al_{10.3}Nb_{2.8}$ bulk metallic glass forming alloy.

I. Gallino, M. B. Shah, and **R. Busch**, Journal of Alloys and Compounds **434-435**, 141 (2007). (11)

The influence of shear rate and temperature on the viscosity and fragility of the $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ metallic-glass-forming liquid.

C. Way, P. Wadhwa und **R. Busch**, Acta Mater. **55**, 2977 (2007). (161)

Thermodynamics, kinetics, and crystallization of $Pt_{57.3}Cu_{14.6}Ni_{5.3}P_{22.8}$ bulk metallic glass.

B. A. Legg, J. Schroers, and **R. Busch**, *Acta Mater.* **55**, 1109 (2007). (149)

Enthalpy relaxation and its relation to the thermodynamics and crystallization of the $Zr_{58.5}Cu_{15.6}Ni_{12.8}Al_{10.3}Nb_{2.8}$ bulk metallic glass-forming alloy.

Gallino, M. B. Shah und **R. Busch**, *Acta Mater.* **55**, 1367 (2007). (164)

Processing of Copper fiber-reinforced $Zr_{41}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ bulk metallic glass composites.

P. Wadhwa, J. Heinrich, and **R. Busch**, *Scripta Materialia* **56**, 73 (2007). (36)

Influence of structural relaxation on the fatigue behavior of a $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ bulk amorphous alloy.

M. E Launey, **R. Busch**, and J. J. Kruzic, *Scripta Materialia* **54**, 483 (2006). (96)

On the fragility of Nb-Ni-based and Zr-based bulk metallic glasses.

L. Shadovskiy and **R. Busch**, *Appl. Phys. Lett.* **85**, 2508 (2004). (118)

On the crystalline equilibrium phases of $Zr_{57}Nb_5Cu_{15.4}Ni_{12.6}Al_{10}$ and $Zr_{58.5}Nb_{2.8}Cu_{15.6}Ni_{12.8}Al_{10.3}$ alloys.

L. Shadovskiy, M. B. Shah, and **R. Busch**, *Scripta Materialia* **50**, 1035 (2004). (23)

Glass formation from viscous metallic liquids.

R. Busch, *Annales de Chimie – Science des Matériaux* **27**, 3 (2002). (11)

Processing of carbon fiber reinforced $Zr_{41}Ti_{14}Cu_{12}Ni_{10}Be_{23}$ bulk metallic glass composites.

C. P. Kim, **R. Busch**, A. Masuhr, H. Choi-Yim, and W. L. Johnson, *Appl. Phys. Lett.* **79**, 1456 (2001). (136)

Transition from nucleation controlled to growth controlled crystallization in $Pd_{43}Ni_{10}Cu_{27}P_{20}$ melts.

J. Schroers, Y. Wu, **R. Busch**, and W. L. Johnson, *Acta Mater.* **49**, 2773 (2001). (154)

Crystallization behavior of the bulk metallic glass forming liquid $Zr_{41}Ti_{14}Cu_{12}Ni_{10}Be_{23}$.

J. Schroers, **R. Busch**, and W. L. Johnson, *Materials Science and Engineering A–Struct* **304**, 287 (2001). (47)

Thermodynamics and kinetics of Zr-Ti-Cu-Ni-Be bulk metallic glass forming liquids.

R. Busch, A. Masuhr, and W. L. Johnson, *Materials Science and Engineering A–Struct* **304**, 97 (2001). (98)

Crystallization kinetics of the bulk-glass-forming $Pd_{43}Ni_{10}Cu_{27}P_{20}$ melt.

J. Schroers J, W. L. Johnson, and **R. Busch**, *Appl. Phys. Lett.* **77**, 1158 (2000). (112)

Thermophysical Properties of Bulk Metallic Glass Forming Liquids.

R. Busch, *Journal of the Minerals Metals & Materials Society (JOM)* **52** (7), 39 (2000). (254)

Thermodynamics of $Cu_{47}Ti_{34}Zr_{11}Ni_8$, $Zr_{52.5}Cu_{17.9}Ni_{14.6}Al_{10}Ti_5$ and $Zr_{57}Cu_{15.4}Ni_{12.6}Al_{10}Nb_5$ bulk metallic glass forming alloys.

S. C Glade, **R. Busch**, D. S. Lee, W. L. Johnson, and R. K. Wunderlich, J. Appl. Phys. **87**, 7242 (2000). (231)

Repeated crystallization in undercooled $Zr_{41}Ti_{14}Cu_{12}Ni_{10}Be_{23}$ liquids.

J. Schroers, A. Masuhr, W. L. Johnson, and **R. Busch**, Appl. Phys. Lett. **76**, 2343 (2000). (53)

Time-temperature superposition of structural relaxation in a viscous metallic liquid.

A. Meyer, **R. Busch**, and H. Schober, Phys Rev. Lett. **83**, 5027 (1999). (128)

Diffusion mechanisms in metallic deeply supercooled liquids and glasses.

X. P. Tang, U. Geyer, **R. Busch**, W. L. Johnson, and Y. Wu, Nature **402**, 160 (1999). (286)

Pronounced asymmetry in the crystallization behavior during constant heating and cooling of a bulk metallic glass forming liquid.

J. Schroers, A. Masuhr, W. L. Johnson, and **R. Busch**, Phys. Rev. B **60**, 11855 (1999). (196)

Thermodynamics and kinetics of the $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ bulk metallic glass forming liquid-glass formation from a strong liquid.

A. Masuhr, **R. Busch**, and W. L. Johnson, J. Non Cryst. Solids **252**, 566 (1999). (59)

Nucleation in undercooled $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ melts.

J. Schroers, A. Masuhr, **R. Busch**, and W. L. Johnson, J. Non Cryst. Solids **252**, 699 (1999). (19)

Synthesis and characterization of particulate reinforced $Zr_{57}Nb_5 Al_{10}Cu_{15.4}Ni_{12.6}$ bulk metallic glass composites.

H. Choi-Yim, **R. Busch**, and W. L. Johnson, Acta Mater. **47**, 2455 (1999). (514)

Continuous refinement of the microstructure during crystallization of supercooled $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ melts.

J. Schroers, **R. Busch**, A. Masuhr, and W. L. Johnson, Appl. Phys. Lett. **74**, 2806 (1999). (101)

Time Scales for viscous flow, Atomic Transport, and Crystallization in the Liquid and Supercooled Liquid State of $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10}Be_{22.5}$.

A. Masuhr, T. A. Waniuk, **R. Busch**, and W. L. Johnson, Phys. Rev. Lett. **82**, 2290 (1999). (322)

Change of compressibility at the glass transition and Prigogine-Defay ratio in Zr-Ti-Cu-Ni-Be alloys

K. Samwer, **R. Busch**, and W. L. Johnson, Phys. Rev. Lett. **82**, 580 (1999). (76)

Slow atomic motion in Zr-Ti-Cu-Ni-Be metallic glasses studied by NMR

X. P. Tang, **R. Busch**, W.L. Johnson, and Y. Wu, Phys. Rev. Lett. **81**, 5358 (1998). (90)

Equilibrium viscosity of the $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10}Be_{22.5}$ bulk metallic glass forming liquid and viscous flow during relaxation, phase separation, and primary crystallization

T. A. Waniuk, **R. Busch**, A. Masuhr, and W. L. Johnson, *Acta Mater.* **46**, 5229 (1998). (278)

Viscosity of the supercooled liquid and relaxation at the glass transition of the $Zr_{46.75}Ti_{8.25}Cu_{7.5}Ni_{10.0}Be_{27.5}$ bulk metallic glass forming alloy.

R. Busch, E. Bakke, and W. L. Johnson, *Acta Mater.* **46**, 4725 (1998). (588)

The effect of silicon on the glass forming ability of the $Cu_{47}Ti_{34}Zr_{11}Ni_8$ alloy during processing of composites.

H. Choi-Yim, **R. Busch**, and W.L. Johnson, *J. Appl. Phys.* **83**, 7993 (1998). (248)

The kinetic glass transition of the $Zr_{46.75}Ti_{8.25}Cu_{7.5}Ni_{10.0}Be_{27.5}$ bulk metallic glass former-supercooled liquids on a long time scale.

R. Busch and W. L. Johnson, *Appl. Phys. Lett.* **72**, 2695 (1998). (164)

Thermodynamics and kinetics of $Mg_{65}Cu_{25}Y_{10}$ bulk metallic glass forming liquids

R. Busch, W. Liu, and W. L. Johnson, *J. Appl. Phys.* **83**, 4134 (1998). (467)

Formation of quasicrystals in bulk glass forming Zr-Cu-Ni-Al alloys

U. Köster, J. Meinhardt, S. Roos, and **R. Busch**, *Mat. Sci. and Engineering A* **226-228**, 995 (1997). (459)

Supercooled melting in multicomponent Zr-Al-Cu-Ni diffusion couples.

R. Busch, E. Bakke, and W. L. Johnson, *Appl. Phys. Lett.* **68**, 2945 (1996). (10)

High resolution microstructure analysis during decomposition of $Cu_{90}Co_{10}$ alloys.

R. Busch, F. Gärtner, C. Borchers, P. Haasen, and R. Bormann, *Acta mater.* **44**, 2567 (1996). (56)

Experimental determination of a time-temperature-transformation diagram of the undercooled $Zr_{41.22}Ti_{13.88}Cu_{12.55}Ni_{10.0}Be_{22.5}$ alloy using containerless electrostatic levitation processing technique

Y.J. Kim, **R. Busch**, W. L. Johnson, A. J. Rulison, and W. K. Rhim, *Appl. Phys. Lett.* **68**, 1057 (1996). (170)

The viscosity of the $Zr_{46.25}Ti_{8.25}Cu_{7.5}Ni_{10.0}Be_{27.5}$ bulk metallic glass forming alloy in the supercooled liquid.

E. Bakke, **R. Busch**, and W. L. Johnson, *Appl. Phys. Lett.* **67**, 3260 (1995). (20)

Decomposition and primary crystallization in undercooled $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ melts.

R. Busch, S. Schneider, A. Peker, and W. L. Johnson, *Appl. Phys. Lett.* **67**, 1544 (1995). (256)

Microstructure development during rapid solidification of highly supersaturated Cu-Co alloys.

R. Busch, F. Gärtner, C. Borchers, P. Haasen, and R. Bormann, *Acta metall. mat.* **43**, 3467 (1995). (56)

Hemispherical total emissivity and specific heat capacity of deeply undercooled $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ melts.

R. Busch, Y. J. Kim, W. L. Johnson, A. J. Rulison, W. K. Rhim, and D. Isheim, Appl. Phys. Lett. **66**, 3111 (1995). (74)

Thermodynamics and kinetics of the undercooled liquid and the glass transition of the $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ alloy.

R. Busch, Y. J. Kim, and W. L. Johnson, J. Appl. Phys. **77**, 4039 (1995). (377)

Metallic glass formation in highly undercooled $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ during containerless electrostatic levitation processing.

Y. J. Kim, **R. Busch**, W. L. Johnson, A. J. Rulison, and W. K. Rhim, Appl. Phys. Lett. **65**, 2136 (1994). (204)

Spinodal decomposition of Cu-Co alloys.

J. M. Liu, **R. Busch**, F. Gärtner, P. Haasen, Z. G. Liu, and Z. C. Wu, Phys. Stat. Sol. (a) **138**, 157 (1993). (16)

Analytical field ion microscopy of the early stage of the solid state amorphization reaction in vapor deposited Zr/Co double layers.

S. Schneider, **R. Busch**, W. Bolse, and K. Samwer, J. Non Cryst. Solids **156-158**, 498 (1993). (4)

Die Neue Atomsonde in Göttingen.

G. P. Geber, T. Al-Kassab, D. Isheim, **R. Busch**, and P. Haasen, Z. Metallkde. **83**, 449 (1992). (17)

Analytische Feldionenmikroskopie der Reaktion in Zr-Co Doppelschichten.

R. Busch, PhD-thesis, Göttingen, 1992. (8)

Ordering of the α -FeSi phase in a $Fe_{73.5}CuNb_3Si_{13.5}B_9$ magnet.

F. Zhu, N. Wang, **R. Busch**, and P. Haasen, Scripta metall. mater. **25**, 2011 (1991). (22)

Analytical field ion microscopy of the solid state amorphisation reaction in vapour deposited Zr/Co double layers.

R. Busch, S. Schneider, and K. Samwer, Nachrichten der Akademie der Wissenschaften in Göttingen, II. Mathematisch-Physikalische Klasse Nr.1 (1991). (5)

Structure and phase transformations of sputtered Nb-Fe and Nb-Co films.

H. U. Krebs, W. Biegel, R. Bormann, and **R. Busch**, J. Non Cryst. Solids, **117+118**, 199 (1990). (5)

Determination of the free energy of metastable crystalline and amorphous NbCo alloys and its application to metastable phase formation.

R. Bormann and **R. Busch**, J. Non Cryst. Solids, **117+118**, 539 (1990). (17)

II. Proceedings [45]:

Impact of Sulfur on the structure and viscosity of glass forming metallic melts.

Johanna Wilden, Fan Yang, Dirk Holland-Moritz, Sandro Szabo, Benedikt Bochtler, Alexander Kuball, **Ralf Busch**, Thomas Buslaps, Andreas Meyer, SINO-GERMAN SYMPOSIUM, 18. - 22. März 2019, Münster, Deutschland (2019).

Parameter study about processing Zr-based bulk metallic glass with Laser beam melting.

J. Wegner, S Kleszczynski, S Hechler, G Witt, **R Busch**, Rapid. Tech-International Trade Show & Conference for Additive Manufacturing: Proceedings of the 15th Rapid. Tech Conference, München, Carl Hanser Verlag GmbH & Co. KG (2017). (5)

Connection Between Structure and Fragility of Metallic Glass-forming Liquids.

Shuai Wei, Jozef Bednarcik, William Hembree, Oliver Gross, Jamie Kruzic, Moritz Stolpe, Zach Evenson, **Ralf Busch**, Isabella Gallino, American Ceramic Society Glass & Optical Materials Division and Deutsche Glastechnische Gesellschaft Joint Annual Meeting 2015 PUBDB-2016-06139

Two liquid states in a strong bulk metallic glass-former: A liquid transforms itself.

Shuai Wei, Fang Yang, Josef Bednarcik, Ivan Kaban, Olga Shuleshova, Andreas Meyer, **Ralf Busch**, Photon Science 2013: Highlights and Annual Report (Deutsches Elektronen-Synchrotron DESY), 56 (2014).

Polyamorphous transformation in bulk metallic glass-forming liquid and its implication to strong liquids.

S. Wei, F. Yang, J. Bednarcik, I. Kaban, A. Meyer, and **R. Busch**, AIP Conference Proceedings **1518**, 260 (2013) (1)

High temperature melt viscosity and fragile-to-strong transition in Zr-Cu-Ni-Al-Nb(Ti) and $Cu_{47}Ti_3Zr_{11}Ni_8$ bulk metallic glasses.

Z. Evenson, T. Schmitt, M. Nicola, I. Gallino, and **R. Busch**, AIP Conference Proceedings **1518**, 197 (2013) (1)

Enthalpy and free volume relaxation in a Zr-Ti-Ni-Cu-Be bulk metallic glass alloy.

Zach Evenson, **Ralf Busch**, Verhandlungen der Deutschen Physikalischen Gesellschaft (2010)

Thermodynamics and kinetics of glass transition during structural ordering of $Fe_{50}Co_{50}$.

Shuai Wei, Isabella Gallino, **Ralf Busch**, Austen Angell, Verhandlungen der Deutschen Physikalischen Gesellschaft (2010).

Distribution of oxides in a Zr-Cu-Ni-Al-Nb-Si bulk metallic glass.

Jochen Heinrich, **Ralf Busch**, Frank Mueller, Stefan Huefner, Verhandlungen der Deutschen Physikalischen Gesellschaft (2010).

Benefits of amorphous 18-carat gold based alloys.

Sergej Mozgovoy, Jochen Heinrich, Ulrich E Klotz, **Ralf Busch**, International Conference on Gold Science, Technology and its Applications : 26/07/2009 - 29/07/2009 (2009)

Fatigue behavior of bulk metallic glasses: role of free volume.

J. J. Kruzic, M. E. Launey, and **R. Busch**, TMS Proceedings, Spring 2006

Shear thinning of bulk metallic glass forming alloy $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ close to the melting point.

T. Shaw, C. Way, and **R. Busch**, Mat. Res. Soc. Symp.Proc. **806**, 215 (2004). (3)

On the fragility of NbNi-based and $Zr_{55-x}Ti_x(CuNi_{18.25-y}B_{26.25-y})$ bulk metallic glass.

L. Shadowspeaker and **R. Busch**, Mat. Res. Soc. Symp.Proc. **806**, 233 (2004). (1)

Molding of fine surface features into bulk metallic glass.

I. McCracken, and **R. Busch**, Mat. Res. Soc. Symp.Proc. **806**, 399 (2004). (4)

Enthalpy relaxation kinetics of the $Zr_{58.5}Nb_{2.8}Cu_{15.6}Ni_{12.8}Al_{10.3}$ supercooled liquid close to the glass transition.

M. Shah, I. Gallino, and **R. Busch**, Res. Soc. Symp.Proc. **806**, 221 (2004).(1)

Thermodynamics of the $Pd_{43}Ni_{10}Cu_{27}P_{20}$ metallic glass forming alloy.

M. Kuno, L.A. Shadowspeaker, J. Schroers, and **R. Busch**, Res. Soc. Symp.Proc. **806**, 227 (2003). (9)

Crystallization of bulk glass forming Pd-based melts.

J. Schroers, J. F. Löffler, E. Pekarskaya, **R. Busch**, and W. L. Johnson, Mat. Sci. Forum **360-3**, 79 (2001) (12)

Crystallization of $Zr_{41}Ti_{14}Cu_{12}Ni_{10}Be_{23}$ melts.

J. Schroers, **R. Busch**, and W. L. Johnson, Mat. Sci. Forum **343-3**, 167 (2000). (1)

The synthesis and properties of bulk metallic glass matrix composites.

H. Choi-Yim, **R. Busch**, and W. L. Johnson, Mat. Res. Soc. Symp.Proc. **554**, (1999).

Crystallization of supercooled $Zr_{41}Ti_{14}Cu_{12}Ni_{10}Be_{23}$ melts during continuous heating and cooling.

J. Schroers, **R. Busch**, A. Masuhr, and W. L. Johnson, Mat. Res. Soc. Symp.Proc. **554**, 263 (1999). (10)

Viscosity, relaxation and crystallization kinetics in strong bulk metallic glass forming liquids.

R. Busch, A. Masuhr, and W. L. Johnson, Mat. Res. Soc. Symp.Proc. **554**, 223 (1999). (6)

Probing slow atomic motions in metallic glasses using NMR.

Y. Wue, X. P. Tang, **R. Busch**, and W. L. Johnson, Mat. Res. Soc. Symp.Proc. **554**, 87 (1999). (2)

Bulk metallic glass formation from strong liquids.

R. Busch, A. Masuhr, E. Bakke, and W. L. Johnson, Mater. Sci. Forum **269-272**, 547 (1998). (53)

A NMR Study of Slow Atomic Motions and Structural Relaxation in Zr-Ti-Cu-Ni-Be Systems.

Y Wu, X-P Tang, **R Busch**, WL Johnson, APS March Meeting Abstracts C14.08 (1998).

Bulk metallic glass formation from strong liquids.

X-P Tang, Y Wu, **R. Busch**, WL Johnson, APS March Meeting Abstracts C14.04 (1998).

The supercooled liquid of the $Zr_{46.75}Ti_{8.25}Cu_{7.5}Ni_{10.0}Be_{27.5}$ alloy on long time scales.

R. Busch, and W. L. Johnson, Mater. Sci. Forum **269-272**, 577 (1998). (21)

Rheometry and crystallization of bulk metallic glass forming alloys at high temperatures.

A. Masuhr, **R. Busch**, and W. L. Johnson, Mater. Sci. Forum **269-272**, 779 (1998). (26)

Characterization of bulk metallic glasses with the atom probe.

M. K. Miller, K.F. Russell, P. M. Martin, **R. Busch**, and W. L. Johnson, Journal de Physique IV **6**, 217 (1998). (15)

Strong liquid behavior of Zr-Ti-Cu-Ni-Be bulk metallic glass forming alloys.

R. Busch, A. Masuhr, E. Bakke, and W. L. Johnson, Mat. Res. Soc. Symp.Proc. **455**, 369 (1997). (39)

On the glass forming ability of bulk metallic glasses.

R. Busch, E. Bakke, and W. L. Johnson, Proceedings of the International Symposium on Metastable and Nanocrystalline Materials 1996 (ISMANAM 96), Rome, Italy, Mater. Sci. Forum, **235-238**, 327 (1997). (44)

Crystallization kinetics of the undercooled $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ alloy during containerless electrostatic levitation processing.

Y. J. Kim, **R. Busch**, W. L. Johnson, A. J. Rulison, and W. K. Rhim, 7th Int. Symp. on Experimental Methods for Microgravity Mat. Sci., TMS Meeting, Anaheim, Feb. 5th-7th1996, edited by R. A. Schiffman (1996).

Determination of the chemical potentials of highly supersaturated Cu-Co alloys.

F. Gärtner, **R. Busch**, P. Haasen, and R. Bormann, Mat. Res. Soc. Symp. Proc. **400**, 119 (1996). (1)

Decomposition of unstable supersaturated $Cu_{90}Co_{10}$ solid solutions.

R. Busch, F. Gärtner, C. Borchers, P. Haasen, and R. Bormann, Mat. Res. Soc. Symp.Proc. **400**, (1995).

Atom probe field ion microscope and levitation studies of the decomposition and crystallization of undercooled Zr-Ti-Cu-Ni-Be melts.

R. Busch, Y.J. Kim, S. Schneider, and W. L. Johnson, Proceedings of the International Symposium on Metastable and Nanocrystalline Materials 1995 (ISMANAM 95), Mater. Sci. Forum **225-227**, 77 (1996). (23)

Viscosity measurements of the $Zr_{46.25}Ti_{8.25}Cu_{7.5}Ni_{10.0}Be_{27.5}$ bulk metallic alloy using parallel plate rheometry and beam bending.

E. Bakke, **R. Busch**, and W. L. Johnson, Proceedings of the ISMANAM 95, Quebec, Canada, Mater. Sci. Forum **225-227**, 95 (1996). (16)

Solid state amorphization and supercooled melting in the Zr-Al-Cu-Ni bulk metallic glass forming alloy system.

R. Busch, E. Bakke, and W. L. Johnson, Proceedings of the ISMANAM 95, Quebec, Canada, Mater. Sci. Forum **225-227**, 141 (1996). (2)

Phase separation and crystallization in the bulk amorphous $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ alloy.

S. Schneider, U. Geyer, P. Thiyagarajan, **R. Busch**, R. Schulz, K. Samwer, and W. L. Johnson, Proceedings of the ISMANAM 95, Quebec, Canada, Mater. Sci. Forum **225-227**, 59 (1996). (23)

Determination of the specific heat capacity and the hemispherical total emissivity of the deeply undercooled $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ alloy.

R. Busch, Y. J. Kim, W. L. Johnson, A. J. Rulison, and W. K. Rhim, 7th Int. Symp. on Experimental Methods for Microgravity Mat. Sci., TMS Meeting, Las Vegas, Feb. 13th-15th 1995, edited by R. A. Schiffman, 15, (1995).

Undercooling studies of the bulk metallic glass forming $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ alloy during containerless electrostatic levitation processing.

Y. J. Kim, **R. Busch**, W. L. Johnson, A. J. Rulison, and W. K. Rhim, 7th Int. Symp. on Experimental Methods for Microgravity Mat. Sci., TMS Meeting, Las Vegas, Feb. 13th-15th, edited by R. A. Schiffman, 153, (1995). (1)

Solid state reactions in the Zr-Al-Cu-Ni bulk metallic glass forming system.

R. Busch, E. Bakke, and W. L. Johnson, Mat. Res. Soc. Symp. Proc. **382**, 63 (1995). (3)

The microstructure of sputtered Co-Cr magnetic recording media.

A. Pundt, **R. Busch**, and C. Michaelsen, Mat. Res. Soc. Symp. Proc **343**, 309 (1994). (3)

The earliest stage of the solid state amorphization reaction in the Zr-Co system.

R. Busch, F. Gärtner, S. Schneider, R. Bormann, and P. Haasen, Mat. Res. Soc. Symp. Proc. **343**, 229 (1994). (13)

High resolution studies of the solid state amorphization reaction in the Zr-Co system with the atom probe/field ion microscope.

S. Schneider, **R. Busch**, and K. Samwer, Mat. Res. Soc. Symp. Proc **343**, 223 (1994).

Phase transformations of supersaturated sputtered $NbCo$ films.

W. Biegel, W. Schaper, H. U. Krebs, J. Hoffmann, H. C. Freyhardt, **R. Busch**, and R. Bormann, Les Colloques de Physique, **C4**, 189 (1990). (1)

Amorphous phase formation by mechanical alloying: thermodynamic and kinetic requirements.

R. Bormann und **R. Busch**, Proc. DGM Conference on New Materials by Mechanical Alloying Techniques, Calw-Hirsau 1988. (1).

III. Patents [5]:

Apparatus and method for producing a cast part formed from amorphous or partially amorphous metal, and cast part.

Ralf Busch, Benedikt Bochtler, Oliver Gross, Simon Hechler, Alexander Kuball, US Patent 11,602,783 (2023).

Sulfurous metallic glass forming alloy.

Alexander Kuball, Benedikt Bochtler, Oliver Gross, Ralf Busch, US Patent 11,384,417 (2022).

Shaped parts having uniform mechanical properties, comprising solid metallic glass.

Moritz Stolpe, Martin Schlott, Eugen Milke, Ralf Busch, US Patent App. 17/433,972 (2022).

Copper-based alloy for the production of bulk metallic glasses.

Ralf Busch, Alexander Elsen, Moritz Stolpe, Hans Jürgen Wachter, Eugen Milke, US Patent 11,214,854 (2022)

Bulk metallic glass forming alloy.

Jochen Heinrich, Ralf Busch, US Patent 9,506,133 (2016). [\(1\)](#)