Curriculum Vitae

Juergen Eckert

FB 11 Material- und Geowissenschaften, FG Physikalische Metallkunde
Technische Universität Darmstadt, Petersenstraße 23, D-64287 Darmstadt

I) Personal:

Date of Birth: August 5, 1962 in
Parents: Hans Helmuth and Hilde Eckert

II) Education:

November 1981 Start of Studying Materials Science at the Friedrich-Alexander University Erlangen-Nürnberg, Germany
October 1983 Pre-Diploma Exam (Dipl.-Ing.)
October 1985 Diploma Exam (Dipl.-Ing.)
December 1985 - October 1986 Diploma Thesis, Topic: "Monotonic and Cyclic Creep of 10 CrMo 9 10 and X6 CrNiMo 17 13 Steels", University Erlangen-Nürnberg; (*Advisor:* Prof. Dr. W. Blum)
November 1986 - May 1990 Ph.D. Thesis (Dr.-Ing.) (summa cum laude) University Erlangen-Nürnberg and Siemens Research Laboratories, Erlangen;Research Center Jülich ,Germany
Topic: "Investigations on the Formation of Amorphous and Quasicrystalline Alloys by Interdiffusion"
Advisors: Prof. Dr. K. Urban and Prof. Dr. L. Schultz

III) Research and Professional Experience:

December 1985 - October 1986 Research Assistant
University of Erlangen-Nürnberg,Germany, Dpt.of Materials Science I
November 1986 - May 1990 Research Associate
Siemens Research Laboratories,Erlangen,Germany
June 1990 - September 1992 Research Fellow in Materials Science
California Institute of Technology, Division of Engineering and Applied Science, Pasadena, CA, USA
October 1992 - Research Associate

July 1993 SGL Carbon / Ringsdorff-Werke GmbH, Powder Metallurgy Research
Laboratory SEL,
August 1993 - Research Associate / Grop Leader "Mechanically Alloyed Materials"
November 1994 IFW Dresden, Institut für Metallische Werkstoffe, Dresden, Germany
December 1994 - Senior Research Associate / Head of "Metastable and Nanostructured
Materials" Group
IFW Dresden, Institut für Metallische Werkstoffe, Dresden, Germany
January 2000 Leading Scientist, IFW Dresden,Germany
September 2002 - Adjunct Professor, Technological University, Dpt. of Materials Science and Engineering, Houghton,MI,USA
October 2003 - Full Processor and Chair for "Physical Metallurgy", Darmstadt University of Technology, Dpt. of Materials and Geo Sciences, Darmstadt, Germany

IV) Scientific Work:

- High temperature strength and creep resistance of steels under monotonic and cyclic loading conditions; mechanisms of plastic deformation and recovery; shear band propagation and strain burst phenomena under different loading conditions; influence of the microstructure on the mechanical properties.

- Synthesis and characterization of metastable crystalline, amorphous and quasicrystalline materials by mechanical alloying / ball milling and solid-state interdiffusion in ultrafine layered composites; investigation of milling-induced phase transitions.
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- Influence of milling conditions on phase formation and stability; investigations of the mechanisms of mechanical attrition / comparison with solid-state reactions in multilayers.
- Synthesis and characterization of nanocrystalline materials by mechanical attrition.

- Consolidation of mechanically attrited metastable alloy powders.

- Phase transitions in metallic alloys induced by mechanical deformation and wear.

- Thermal stability and phase transitions in metastable crystalline, amorphous and quasicrystalline alloys; thermodynamic and kinetic description of phase transformations.

- Influence of composition and grain size on the ordering transition and the stability of nanocrystalline intermetallic compounds.

- Grain growth characteristics in nanocrystalline metals and alloys; studies on grain boundary structure and energy; grain boundary migration in metals and alloys; solute segregation and thermal stability in binary nanocrystalline solid solutions and their influence on the suppression of grain growth.

- Concept for the ultimate grain size achievable by mechanical attrition; plastic deformation and solute hardening / softening mechanisms in nanocrystalline alloys; recovery and recrystallization effects.

- Investigation of compositionally induced reversible grain size changes in nanocrystalline materials; underlying mechanisms and thermodynamic description.

- Alloy formation in immiscible systems; influence of nanocrystalline grain size and mechanically induced deformation on the solubility enhancement.

- Investigation of mechanical properties, wear resistance and dimensional changes of powder metal parts; mechanisms of sintering and influence of sintering conditions on microstructure, mechanical properties etc; post-sintering heat and surface treatments.

- Synthesis and characterization of mechanically alloyed high-strength aluminum alloys.
- (multicomponent alloy systems with amorphous, nanocrystalline or quasicrystalline phases) or multicomponent Mg-based alloys(amorphous-nanocrystalline phase mixtures with or without ODS particles); investigations on phase formation, thermal stability and phase transitions and mechanical properties at different temperatures and strain rates.

- Nanocrystalline soft-magnetic materials and permanent magnets; investigations on the influence of composition and heat treatment on structural and magnetic properties; hot-consolidation of mechanically alloyed magnetic powders.
- Intermetallic phases for high-temperature structural applications prepared by melting, rapid quenching and mechanical attrition techniques (e.g. Ni-Al, Al-Cr-Ti based alloys with and witout oxide dispersoids).

- Alloy formation and characterization of superconducting properties in rare earth-based intermetallic compounds; influence of defect structures and changes in stoichiometry on the superconducting properties.

- Magnetic bulk amorphous Fe/Co/Ni and Nd-, Sm-based alloys with extended supercooled liquid region, good ductility and high mechanical strength; preparation by mechanical alloying, rapid quenching and slow cooling from the melt; powder compaction; investigations of phase formation, thermal stability, relaxation; shaping in the supercooled liquid region; mechanical and magnetic properties.

- Bulk amorphous and quasicrystalline Zr-, Ti-, Al-, Cu-, Ce-and Mg-based alloys with large supercooled liquid region, good ductility and high mechanical strength by mechanical alloying, rapid quenching and die casting; consolidation of amorphous powders; characterization of thermal stability, glass transition and relaxation behavior; mechanical properties and deformation at different temperatures, including investigations on the viscous flow deformation in the supercooled liquid state; wear and corrosion resistance of consolidated powders and cast bulk amorphous alloys.

- Biocompatibility of bulk metallic glasses and nanostructured materials and development of components for medical applications; components for microsystems.

- Surface coatings for improved thermal and wear resistant applications on the basis of bulk metallic glasses and nanostructured materials.

- Hydrogen-induced phase transitions and grain size changes of nanocrystalline materials; hydrogen storage in amorphous and nanostructured materials (metallic systems, carbon particles and nanotubes).

- Synthesis of new superconducting materials (e.g. MgB_2, $MgCNi_3$) by mechanical alloying; influence of nanocrystalline grain structure, internal stresses and stoichiometry variations on the superconducting properties; powder consolidation and preparation of tapes and wires by the powder-in-tube technique.

- Micro- and nanostructured composites based on bulk metallic glasses (e.g. Zr-, Ti-, and Mg-based systems) ; phase formation, stability physical properties, mechanical behavior and corrosion resistance.

- Nanoindentation of metallic glasses and naostructured materials.

V) Activities / Experiences / Teaching:

- Supervision of undergraduate and graduate students, summer students etc. (University of Erlangen-Nürnberg; Siemens Research Laboratories; California Institute of Technology, ; / IFW).

- Organisation and teaching of seminars on "Magnetic Materials" and Metastable Alloys";

teaching of undergraduate and graduate courses "Metal Physics in Materials Science",
"Physical Metallurgy" and "Nanostructured and Amorphous Materials" (Technical
University Dresden).

- Research cooperation with a variety of research groups in Germany, Europe, North and south America, Australia, India, Japan, Korea, China; participation in "Special Research Areas" ("Sonderforschungsbereich"), "Priority Research Programs" ("Schwerpunktprogramm"), programs for highly qualified Ph.D. students ("Graduiertenkolleg") and Centers of Excellence.

- Industrial experience (Siemens AG, SGL Carbon / Ringsdorff-Werke GmbH) and collaboration with a variety of industrial partners.

- Head of "Metastable and Nanostructured Materials" Group (about 32 scientists, technicians and graduate students), IFW Dresden, Institut für Metallische Werkstoffe.

- Acting as Deputy Head of the Institut für Metallische Werkstoffe at the IFW Dresden (about 140 coworkers) in absence of the Head of the Institute (Prof. Dr. L. Schultz).

- Elected as member of the Scientific-Technological Board of the IFW Dresden (10/1997 - 09/1999).

- Elected as member of the Faculty Committee of the Dpt. of Materials and Geo Sciences at Darmstadt University of Technology.

- Board member of the Materials Forum (MatForm) for University-Industry Collaborations in the Rhein-Main Area.

- Elected as member of the Metal Physics Work Group of the German Physical Society('Arbeitsgemeinschaft Metallphysik der DPG').

- Elected as member of the International Advisory Committee for the Conference Series 'Rapidly Quenched &Metastable Materials (RQ)' and 'International Symposium on Metastable, Mechanically Alloyed and Nanocrystalline Materials (ISMANAM)'.

- Elected as member of the Editorial Advisory Board of 'Materials Science Foundations' (Trans Tech Publications) and of the Editorial Board of 'Journal of Materials Research' and 'Journal of Metastable and Nanocrystalline Materials'.

- Refereeing activities (selected):

- DFG, BMBF, Volkswagen-Foundation, Alexander-von-Humboldt-Stiftung, DAAD, Deutsch-Israelische Stiftung für wissenschaftliche Forschung und Entwicklung, EU, Schweizerischer Nationalfonds, Österreichische Akademie der Wissenschaften, Universtity Padua, DOE, (USA), National Science Foundation NSF (USA) etc.
- Referee für different international Journals (e.g. Acta Mater., Scripta Mater., Nanostruct. Mater., Philos. Mag. A, Philos. Mag. Lett., Metall. Mater. Trans., Mater. Sci. Eng. A, J. Appl. Phys., Appl. Phys. Lett., Phys. Stat. Sol., J. Phys. D: Appl. Phys., J. Alloys & Compounds, Adv. Eng. Mater., Mater.

Sci. & Technol., Intermetallics, Advanced Mater., Advanced Functional Mater., Nature Mater., Science, Thin Solid Films, etc.)

- Organisation of Symposia and Conferences:

- 4th International Symposium on Electrochemical/Chemical Reactivity of Amorphous and Nanocrystalline Alloys, , 8. - 10. Oktober 1997
- International Symposium on Metastable, Mechanically Alloyed and Nanocrystalline Materials ISMANAM-99, , 30. August - 3. September 1999
- International Conference on Processing and Manufacturing of Advanced Materials THERMEC 2003, , 7. - 11. Juli 2003
- Symposium on Amorphous and Nanocrystalline Metallic Materials im Rahmen des MRS Fall Meetings 2003, , 1. - 4. Dezember 2003
- Session on Mechanical Properties and Applications; 7th International Conference on Nanostructured Materials NANO 2004, , 20. - 24. June 2004.
- Symposium on Glass Formation at Materials Week 2004, München, 21. - 23. September 2004.
- Co-Chair of the 1st International Conference on Mechanics and Mechanical Properties of Non-crystalline Materials I: Amorphous Metals, , 23. - 28. April 2006.
- Technical Program Session Organizer Nano- & Ultrafine Grained Materials at the 2006 Powder Metallurgy World Congress and Exhibition, Busan, Korea, 24. - 28. September 2006.

VI) Awards:

- DGM 1994 Young Scientist Award of the German Materials Research Society (Deutsche Gesellschaft für Materialkunde DGM)(awarded at the annual DGM General Meeting 1995 at , June 1995)
- ISMANAM-95 Young Scientist Award(awarded at the 1995 International Symposium on Metastable, Mechanically Alloyed and Nanocrystalline Materials ISMANAM-95 at , July 1995)
- Materials Science and Technology Prize 1997 of the Federation of European Materials Scocieties (FEMS)(awarded at the 5th European Conference on Advanced Materials, Processes and Applications EUROMAT 97, , The , April 1997)

- Georg-Sachs-Prize 1997 of the Austrian Metal Industry (Stifterverband Metalle und Fachverbandes der Metallindustrie Österreichs) (awarded at the annual DGM General Meeting 1998, , October 1998)

- IFW Dresden Research Award 2002 for outstanding results in the field of bulk amorphous metals

VII) Publications:

Refereed Publications in International Journals

1. E. Hellstern, J. Eckert, L. Schultz, " of Mechanically Alloyed Powders", *J. Less-Common Metals* **140**, 93 (1988).
2. J. Eckert, L. Schultz, E. Hellstern, K. Urban, "Glass-Forming Range in Mechanically Alloyed Ni-Zr and the Influence of the Milling Intensity", *J. Appl. Phys.* **64**, 3224 (1988).
3. J. Eckert, L. Schultz, K. Urban, " in Transition Metal-Zr Alloys Prepared by Mechanical Alloying", *J. Less-Common Metals* **145**, 283 (1988).
4. J. Eckert, L. Schultz, K. Urban, "Formation of Quasicrystals by Mechanical Alloying", *Appl. Phys. Lett.* **55**, 117 (1989).
5. J. Eckert, L. Schultz, "Preparation of Multilayers for Amorphization by Solid-State Reaction", *J. de Physique Coll.* **C4(51)**, C4-229 (1990).
6. J. Eckert, L. Schultz, K. Urban, "Phase Transitions and Quasicrystal Formation in Al-Cu-Mn Induced by Ball Milling", *Europhys. Lett.* **13**, 349 (1990).
7. J. Eckert, L. Schultz, K. Urban, "Glass Formation and Extended Solubilities in Mechanically Alloyed Co-Transition Metal Alloys", *J. Less-Common Metals* **166**, 293 (1990).
8. J. Eckert, L. Schultz, K. Urban, "Compositional Dependence of Quasicrystal Formation in Mechanically Alloyed Al-Cu-Mn", *J. Less-Common Metals* **167**, 143 (1990).
9. J. Eckert, L. Schultz, K. Urban, "Progress of Quasicrystal Formation during Mechanical Alloying in Al-Cu-Mn and the Influence of the Milling Intensity", *Z. Metallkde.* **81**, 862 (1990).
10. J. Eckert, L. Schultz, K. Urban, "Amorphization Reaction during Mechanical Alloying: Influence of the Milling Conditions", *J. Mater. Sci.* **26**, 441 (1991).
11. J. Eckert, L. Schultz, K. Urban, "Synthesis of Ni-Ti and Fe-Ti Alloys by Mechanical Alloying: Formation of Amorphous Phases and Extended Solid Solutions", *J. Non-Cryst. Solids* **127**, 90 (1991).
12. J. Eckert, L. Schultz, K. Urban, "Formation of Quasicrystalline and Amorphous Phases in Mechanically Alloyed Al-Based and Ti-Ni-Based Alloys", *Acta Metall. Mater.* **39**, 1497 (1991).

13. J. Eckert, L. Schultz, K. Urban, "Quasicrystal Formation and Phase Transitions by Ball Milling", *Mater. Sci. A* **133**, 393 (1991).
14. J. Eckert, L. Schultz, K. Urban, "Comparison of Solid-State Amorphization by Mechanical Alloying or Interdiffusion in Ni-Zr", *Mater. Sci. A* **134**, 1389 (1991).
15. J. Eckert, L. Schultz, K. Urban, "Comparison of Glass Formation by Mechanical Alloying and Solid-State Interdiffusion in Ni-Zr Composites", *J. Non-Cryst. Solids* **130**, 273 (1991).
16. J. Eckert, L. Schultz, K. Urban, "Interdiffusion Reaction, Phase Sequence, and Glass Formation in Ni-Zr Composites", *J. Mater. Res.* **6**, 1874 (1991).
17. J. Eckert, J.C. Holzer, C.E. Krill III, W.L. Johnson, "Structural and Thermodynamic Properties of Nanocrystalline fcc Metals Prepared by Mechanical Attrition", *J. Mater. Res.* **7**, 1751 (1992).
18. J. Eckert, J.C. Holzer, C.E. Krill III, W.L. Johnson, "Reversible Grain Size Changes in Ball-Milled Nanocrystalline Fe-Cu Alloys", *J. Mater. Res.* **7**, 1980 (1992).
19. J. Eckert, J.C. Holzer, W.L. Johnson, "Influence of Microstructure and Composition on the Grain Size of Nanocrystalline Fe-Cu Alloys", *Scripta Metall. Mater.* **27**, 1105 (1992).
20. J. Eckert, J.C. Holzer, W.L. Johnson, "Thermal Stability and Grain Growth Behavior of Mechanically Alloyed Nanocrystalline Fe-Cu Alloys", *J. Appl. Phys.* **73**, 131 (1993).
21. J. Eckert, J.C. Holzer, C.E. Krill III, W.L. Johnson, "Mechanically Driven Alloying and Grain Size Changes in Nanocrystalline Fe-Cu Powders", *J. Appl. Phys.* **73**, 2794 (1993).
22. J. Eckert, J.C. Holzer, C.C. Ahn, Z. Fu, W.L. Johnson, "Melting Behavior of Nanocrystalline Aluminum Powders", *Nanostructured Materials* **2**, 407 (1993).
23. J. Eckert, J.C. Holzer, M. Li, W.L. Johnson, "Effects of Chemistry on the Grain Size Refinement in Nanocrystalline Ru and Ru-C Powders Prepared by Mechanical Alloying", *Nanostructured Materials* **2**, 433 (1993).
24. J. Eckert, "Relationships Governing the Grain Size of Nanocrystalline Metals and Alloys", *Nanostructured Materials* **6**, 413 (1995).
25. M. Seidel, J. Eckert, L. Schultz, "Formation of Amorphous Zr-Al-Cu-Ni with Large Supercooled Liquid Region by Mechanical Alloying", *J. Appl. Phys.* **77**, 5446 (1995).
26. M. Seidel, J. Eckert, L. Schultz, "Mechanically Alloyed Zr-Ti-Cu-Ni Amorphous Alloys with Significant Supercooled Liquid Region", *Mater. Lett.* **23**, 299 (1995).
27. V. Neu, P. Crespo, R. Schäfer, J. Eckert, L. Schultz, "High Remanence NdFeBX (X = Cu, Si, NbCu, Zr) Powders by Mechanical Alloying", *J. Magn. Magn. Mater.* **157/158**, 61 (1996).
28. V. Neu, U. Klement, R. Schäfer, J. Eckert, L. Schultz, "Remanence Enhancement in Mechanically Alloyed Two-Phase Nd-Fe-B Magnetic Material", *Mater. Lett.* **26**, 167 (1996).

29. R. Schäfer, C. Stiller, J. Eckert, U. Klement, S. Roth, L. Schultz, "Domain Studies on Mechanically Alloyed Fe-Zr-B-Cu Nanocrystalline Powder", *IEEE Trans. Magn.* **32**, 4383 (1996).
30. J. Eckert, M. Seidel, L. Schultz, "Formation of Amorphous Alloys with Significant Supercooled Liquid Region by Mechanical Alloying", *J. Non-Cryst. Solids* **205-207**, 500 (1996).
31. M. Seidel, J. Eckert, E. Zueco-Rodrigo, L. Schultz, "Mg-Based Amorphous Alloys with Extended Supercooled Liquid Region Produced by Mechanical Alloying", *J. Non-Cryst. Solids* **205-207**, 514 (1996).
32. C. Stiller, J. Eckert, S. Roth, R. Schäfer, U. Klement, L. Schultz, "Mechanically Alloyed Fe-(Zr, B)-Cu Alloys: Effect of Composition and Heat Treatment on the Microstructure and the Magnetic Properties", *J. Non-Cryst. Solids* **205-207**, 620 (1996).
33. B. Fultz, C.C. Ahn, S. Spooner, L.B. Hong, J. Eckert, W.L. Johnson, "Incipient Chemical Instabilities of Nanophase Fe-Cu Alloys Prepared by Mechanical Alloying", *Metall. Mater. Trans.* **27A**, 2934 (1996).
34. A. Gebert, K. Mummert, J. Eckert, L. Schultz, A. Inoue, "Electrochemical Investigations on the Bulk Glass Forming $Zr_{55}Cu_{30}Al_{10}Ni_5$Alloy", *Materials and Corrosion* **48**, 293 (1997).
35. J. Eckert, "Massive amorphe Metalle", *Wiss. Z. Techn. Univer.* **46**, 86 (1997).
36. J. Eckert, K. Jost, L. Schultz, "Synthesis and Properties of Mechanically Alloyed Y-Ni-B-C, *Mater. Lett.* **31**, 329 (1997).
37. J. Eckert, "Mechanical Alloying of Highly Processable Glassy Alloys", *Mater. Sci.* **A226-228**, 364 (1997).
38. M. Seidel, M. Reibold, Bächer, H.-D. Bauer, J. Eckert, L. Schultz, "Progress of Solid State Reaction During Mechanical Alloying of Zr-Al-Cu-Ni Bulk Metallic Glass Forming Alloys", *Mater. Sci.* **A226-228**, 383 (1997).
39. N. Schlorke, J. Eckert, L. Schultz, "Synthesis of Multicomponent Fe-Based Amorphous Alloys with Significant Supercooled Liquid Region by Mechanical Alloying", *Mater. Sci.* **A226-228**, 425 (1997).
40. N. Mattern, J. Eckert, M. Seidel, U. Kühn, S. Doyle, Bächer, "Relaxation and Crystallization of Amorphous $Zr_{65}Al_{7.5}Cu_{17.5}Ni_{10}$", *Mater. Sci.* **A226-228**, 468 (1997).
41. Börner, J. Eckert, "Nanostructure Formation and Steady-State Grain Size of Ball-Milled Iron Powders", *Mater. Sci.* **A226-228**, 541 (1997).
42. C. Stiller, J. Eckert, P. Crespo, S. Roth, L. Schultz, "Structural and Magnetic Properties of Nanocrystalline $(FeCu)_{93}Zr_7$ Alloys Prepared by Mechanical Alloying", *Mater. Sci.* **A226-228**, 577 (1997).
43. J. Eckert, Börner, "Nanostructure Formation and Properties of Ball-Milled NiAl Intermetallic Compound", *Mater. Sci.* **A239-240**, 619 (1997).
44. M. Heilmaier, H. Saage, J. Eckert, "Formation of ODS $L1_2$-$(Al, Cr)_3Ti$ by Mechanical Alloying", *Mater. Sci.* **A239-240**, 652 (1997).

45. J. Eckert, M. Seidel, A. Kübler, U. Klement, L. Schultz, "Oxide Dispersion Strengthened Mechanically Alloyed Amorphous Zr-Al-Cu-Ni Composites", *Scripta Mater.* **38**, 595 (1998).

46. A. Kübler, J. Eckert, A. Gebert, L. Schultz, "Influence of Impurities on the Viscosity of Zr-Al-Cu-Ni Metallic Glasses in the Undercooled Liquid Region", *J. Appl. Phys.* **83**, 3438 (1998).

47. M. Seidel, M. Reibold, J. Eckert, "Investigations of the Solid State Reaction Process in Mechanically Alloyed Zr-Al-Cu-Ni Bulk Metallic Glasses by Analytical Transmission Electron Microscopy", *Fresenius J. Anal. Chem.* **361**, 740 (1998).

48. J. Eckert, , M. Zinkevitch, M. Seidel, "Crystallization Behavior and Phase Formation in Zr-Al-Cu-Ni Metallic Glass Containing Oxygen", *Mater. Trans. JIM.* **39**, 623 (1998).

49. N. Mattern, S. Roth, G. Henninger, H. Hermann, J. Eckert, "Structural and Magnetic Properties of Amorphous $(Zr_{65}Al_{7.5}Cu_{17.5}Ni_{10})_{100-x}Fe_x$ Alloys", *J. Phys.: Condensed Matter* **10**, L575 (1998).

50. A. Gebert, J. Eckert, L. Schultz, "Effect of Oxygen on Phase Formation and Thermal Stability of Slowly Cooled $Zr_{65}Al_{7.5}Cu_{17.5}Ni_{10}$ Metallic Glass", *Acta Mater.* **46**, 5475 (1998).

51. A. Leonhard, L.Q. Xing, M. Heilmaier, A. Gebert, J. Eckert, L. Schultz, "Effect of Crystalline Precipitations on the Mechanical Behavior of Bulk Glass Forming Zr-Based Alloys", *Nanostructured Materials* **10**, 805 (1998).

52. L.Q. Xing, J. Eckert, W. Löser, L. Schultz, "Effect of Cooling Rate on the Precipitation of Quasicrystals from the Zr-Cu-Al-Ni-Ti Amorphous Alloy", *Appl. Phys. Lett.* **73**, 2110 (1998).

53. L.Q. Xing, J. Eckert, W. Löser, L. Schultz, "High-Strength Materials Produced by Precipitation of Icosahedral Quasicrystals in Bulk Zr-Ti-Cu-Ni-Al Amorphous Alloys", *Appl. Phys. Lett.* **74**, 664 (1999).

54. N. Schlorke, J. Eckert, L. Schultz, "Thermal and Magnetic Properties of Bulk Glass Forming
Fe-Al-P-C-B-(Ga) Alloys", *J. Phys. D: Appl. Phys.* **32**, 855 (1999).

55. L.Q. Xing, J. Eckert, W. Löser, L. Schultz, D.M. Herlach, "Crystallization Behaviour and Nano-crystalline Microstructure Evolution of a $Zr_{57}Cu_{20}Al_{10}Ni_8Ti_5$ Bulk Amorphous Alloy", *Philos. Mag.* **A79**, 1095 (1999).

56. M. Multigner, A. Hernando, P. Crespo, C. Stiller, J. Eckert, L. Schultz, "Structural and Magnetic Properties of Mechanically Alloyed $(Fe_xCu_{1-x})_{93}Zr_7$ (x = 0.5, 0.7) Solid Solutions", *J. Magn. Magn. Mater.* **196-197**, 214 (1999).

57. J. Eckert, A. Kübler, L. Schultz, "Mechanically Alloyed $Zr_{55}Al_{10}Cu_{30}Ni_5$ Metallic Glass Composites Containing Nanocrystalline W-Particles", *J. Appl. Phys.* **85**, 7112 (1999).

58. L. Ledig, D. Hough, C.-G. Oertel, J. Eckert, W. Skrotzki, "Nanocrystal Formation, Amorphization and Superconductivity in YNi_2B_2C", *J. Alloys & Compounds* **285**, 27 (1999).

59. A. Gebert, K. Buchholz, A. Leonhard, K. Mummert, J. Eckert, L. Schultz, "Investigations on the Electrochemical Behaviour of Zr-Based Bulk Metallic Glasses", *Mater. Sci.* ***A267,*** *294* (1999).

60. F. Schurack, J. Eckert, L. Schultz, "High Strength Al-Alloys with Nano-Quasicrystalline Phase as Main Component", *Nanostructured Materials* **12**, 107 (1999).

61. N. Schlorke, B. Weiß, J. Eckert, L. Schultz, "Properties of Mg-Y-Cu Glasses with Nanocrystalline Particles", *Nanostructured Materials* **12**, 127 (1999).

62. J. Eckert, M. Seidel, L.Q. Xing, Börner, B. Weiß, "Nanophase Composites in Easy Glass Forming Alloys", *Nanostructured Materials* **12**, 439 (1999).

63. A. Kübler, J. Eckert, L. Schultz, "Nanoparticles in an Amorphous $Zr_{55}Al_{10}Cu_{30}Ni_5$ Matrix - The Formation of Composites by Mechanical Alloying", *Nanostructured Materials* **12**, 443 (1999).

64. L.Q. Xing, J. Eckert, L. Schultz, "Deformation Mechanism of Amorphous and Partially Crystallized Alloys", *Nanostructured Materials* **12**, 503 (1999).

65. J. Eckert, "Mechanical Alloying of Bulk Metallic Glass Forming Systems", ", *J. Metastable and Nanocrystalline Materials* **2-6**, 3 (1999).

66. F. Schurack, Börner, J. Eckert, L. Schultz, "Synthesis and Properties of Mechanically Alloyed and Ball Milled High Strength Amorphous or Quasicrystalline Al-Alloys", *J. Metastable and Nanocrystalline Materials* **2-6**, 49 (1999).

67. A. Gümbel, L. Ledig, D. Hough, C.-G. Oertel, W. Skrotzki, J. Eckert, L. Schultz, "Mechanically Attritred Superconducting Y-TM-B-C Borocarbides (TM = Ni, Pd)", *J. Metastable and Nanocrystalline Materials* **2-6**, 61 (1999).

68. M. Leonhardt, H.-G. Lindenkreuz, W. Löser, J. Eckert, "Metastable Phase Formation and Microstructure Evolution from Undercooled Eutectic Melts", *J. Metastable and Nanocrystalline Materials* **2-6**, 275 (1999).

69. G.J. Fan, M.X. Quan, Z.Q. Hu, W. Löser, J. Eckert, "Deformation-Induced Microstructural Changes in $Fe_{40}Ni_{40}P_{34}B_6$ Metallic Glass", *J. Mater. Res.* **14**, 3765 (1999).

70. N. Mattern, H. Ehrenberg, A. Knapp, H. Hermann, J. Eckert, "Short-Range Order of Amorphous $(Zr_{65}Al_{7.5}Cu_{17.5}Ni_{10})_{100-x}Fe_x$ Alloys", *Phys. Stat. Sol. (a)* **175**, 449 (1999).

71. G.J. Fan, W. Löser, S. Roth, J. Eckert, L. Schultz, "Magnetic Properties of Cast
$Nd_{60-x}Fe_{20}Al_{10}Co_{10}Cu_x$ Alloys", *Appl. Phys. Lett.* **75**, 2984 (1999).

72. J. Eckert, N. Schlorke-de Boer, B. Weiß, L. Schultz, "Mechanically Alloyed Mg-Based Metallic Glasses and Metallic Glass Composites Containing Nanocrystalline Particles", *Z. Metallkde.* **90**,
908 (1999).

73. G.J. Fan, M.X. Quan, Z.Q. Hu, J. Eckert, L. Schultz, "In-Situ Formation of $NbSi_2$-Based Nano- composites by Mechanical Alloying", *Scripta Mater.* **41**, 1147 (1999).

74. N. Ismail, M. Uhlemann, A. Gebert, J. Eckert, "Hydrogenation and its Effect on the Crystallization Behaviour of $Zr_{55}Cu_{30}Al_{10}Ni_5$ Metallic Glass", *J. Alloys & Compounds* **298**, 146 (2000).

75. L.C. Damonte, L. Mendoza-Zélis, J. Eckert, "Short Range Order in Bulk Zr- and Hf-Based Amorphous Alloys", *Mater. Sci. A278, 16 (2000).*

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4. I. Börner and J. Eckert, "Nanostructure Formation in Ball Milled Iron Powders", *La Revue de Metallurgie SF2M-JA97,* p. 124.
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6. L. Schultz, A. Bollero, A. Handstein, D. Hinz, A. Kirchner, A. Yan, K.-H. Müller, G. Kumar, J. Eckert, O. Gutfleisch, "Nanocomposite Magnetic Materials", in: *Proc. 1st - Joint Seminar on Nanostructured Materials, 18.-19.11.2002, ,* pp. 65.
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9. M. Adam, M. Calin, D. Bunea, J. Eckert, B. Rellinghaus, "Nanocrystallization Kinetics of Ti-Rich Glassy Alloys Investigated by Kissinger Method", in: *Proc. Int. Conf. on Biomaterials & Medical Devices BiomMedD' 2004, 05.-07.11.2004, Bukarest, Rumänien*, p. 7.

VIII)Patents:

Since 1992: 15 patents on different topics in the areas of materials science ond processing technology.

IX) Invited Talks at Conferences, Symposia and Seminars:

1. J. Eckert, "Milling Induced Phase Transitions and Quasicrystal Formation in Al-Cu-Based Alloys", *International Symposium on Mechanical Alloying, , 08.05.1991.*
2. J. Eckert, "Investigation of Nanometer-Sized fcc Metals Prepared by Ball Milling", *Seminar on Mechanical Alloying and Mechanochemistry, , 13.05.1991.*
3. J. Eckert, Y.R. Abe, Z. Fu und W.L. Johnson, "Minimum Grain Size in Nanocrystalline Metal Powders", *MRS Spring Meeting, San Francisco, USA, 29.04.1992*.
4. J. Eckert, "Synthesis of Nanophase Metals and Alloys Through Solid State Processing", *Massachussetts Institute of Technology, Boston, USA, 27.02.1992.*
5. J. Eckert, "Bildung nanokristalliner Metalle und Legierungen durch mechanische Verformung und Festkörperreaktion", *Max-Planck-Institut für Werkstoffwissenschaft, Stuttgart, 10.04.1992.*

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7. W. Zimmermann, J. Eckert, "Heat Treatment of P/M Parts - Mechanical Properties and Tolerances", *1993 Powder Metallurgy World Congress, Kyoto, Japan, 14.07.1993.*
8. J. Eckert, "Herstellung metastabiler Phasen durch Festkörperreaktion und mechanisches Legieren", *Institut für Werkstoffwissenschaften und Fertigungstechnik der Universität Saarbrücken, 29.01.1994.*
9. J. Eckert, "Phasenbildung und thermische Stabilität mechanisch legierter nanokristalliner Fe-Cu-Legierungen", *Annual Meeting of the German Society of Materials Science (DGM), Göttingen, 26.05.1994.*
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11. J. Eckert, "Metastable Phase Formation Through Mechanical Deformation and Reaction", *at , , 22.06.1995.*
12. J. Eckert, "Synthesis of Amorphous and Nanocrystalline Phases Through Processing", *Technological University, , 17.07.1995.*
13. J. Eckert, "Fabrication and Processing of Bulk Metallic Glasses by Mechanical Alloying", *Edgar Lüscher Seminar, , 29.01.1996.*
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15. J. Eckert, "Mechanical Alloying of Highly Processable Glassy Alloys", *9th Int. Conf. on Rapidly Quenched and Metastable Materials, , Slowakia, 26.08.1996.*
16. J. Eckert, "Herstellung und Eigenschaften nanokristalliner und amorpher Werkstoffe", *Institut für Metallkunde der Universität Stuttgart, 23.01.1997.*
17. J. Eckert, "Metallic Glass Formation in Multicomponent Alloys", *5th Europ. Conf. on Advanced Materials (EUROMAT 1997), Processes and Applications, , Niederlande, 21.04.1997.*
18. J. Eckert, "Phasenbildung unter Nichtgleichgewichtsbedingungen", *Werkstoffkolloqium der Universität Karlsruhe, 24.06.1997.*
19. J. Eckert, "Mechanical Alloying of Advanced Materials", *Technical Seminar International Wrought Copper Councils, , 24.10.1997.*
20. J. Eckert, "Solid State Processing of Nanomaterials", *Fall Meeting Societe Francaise de Metallurgie et de Materiaux SF2M, Paris, France, 26.11.1997.*
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22. A. Leonhard, L.Q. Xing, M. Heilmaier, A. Gebert, J. Eckert und L. Schultz, "Effect of Crystalline Precipitations on the Mechanical Behavior of Bulk Glass Forming Zr-Based Alloys", *TMS Annual Meeting, San Antonio, USA, 16.02.1998.*

23. J. Eckert, "Metastabile Phasen durch Nicht-Gleichgewichtsprozesse", *Hahn-Meitner-Institut Berlin, 27.02.1998.*
24. J. Eckert, " Processing of Bulk Metallic Glasses", *APS March Meeting, , 17.03.1998.*
25. J. Eckert, "Synthesis and Properties of Bulk Metallic Glasses and Glass-Matrix-Composites",
MRS Fall Meeting, , 02.12.1998.
26. J. Eckert, "Mechanical Alloying of Bulk Metallic Glass Forming Systems", *Int. Symp. on Metastable, Mechanically Alloyed and Nanocrystalline Materials, , 10.12.1998.*
27. J. Eckert, "Neue Materialien durch Nichtgleichgewichtsverfahren", *20. Adelbodener Werkstoffseminar 1999, Adelboden, Switzerland, 08.03.1999.*
28. J. Eckert, "Nanokristalline Materialien durch Festkörperreaktion", *1999 Spring Meeting of the*
German Physical Society (DPG), Münster, 24.03.1999.
29. J. Eckert, "Mechanisch legierte metastabile Materialien", *Institut für Physikalische Metallkunde, Technische Universität Dresden, 06.05.1999.*
30. J. Eckert, "Structure and Properties of Advanced Materials Based on Metastable Phases", *Technische Universität , Niederlande, 28.05.1999.*
31. J. Eckert, "Nanokristalline und amorphe Materialien in multinären Systemen", *Institut für Physikalische Chemie und Elektrochemie, Universität Hannover, 31.05.1999.*
32. J. Eckert, "Neue Materialien auf der Basis metastabiler Phasen", *Technische Universität Berlin,*
08.06.1999.
33. J. Eckert, "Metastabile Phasen als Grundlage für neue Materialien", *Friedrich-Schiller-Universität*
, 16.07.1999.
34. J. Eckert, "Nanostructured Materials in Multicomponent Alloy Systems", *TMS Fall Meeting,*
, 04.11.1999.
35. F. Schurack, J. Eckert, L. Schultz, "Quasicrystal-Reinforced High-Strength Al-Alloys By Rapid Solidification and Reaction - Structure and Physical Properties", *German-French Colloqium SPQK and GDR-CINQ, , 07.04.2000.*
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38. J. Eckert, "Massive amorphe und nanostrukturierte Materialien", *Kolloqium "Angewandte Werkstoffkunde", Technische Universität Clausthal, Clausthal-Zellerfeld, 10.10.2000.*

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58. J. Eckert, U. Kühn, G. He, , , A. Gebert, "Phase Formation, Microstructural Design and Mechanical Properties of Bulk Metallic Glass Composites", *MRS Fall Meeting, , 06.12.2002.*
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63. J. Eckert, "The Role of Microstructure, Length Scales and Second Phase Properties in the Strengthening of Nanostructured Materials and Metallic Glass Composites", *2nd Int. Germany-Korea Workshop on Nanostructured Materials, , 19.11.2003.*
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68. J. Eckert, "Materialentwicklung und Anwendungspotential metastabiler Phasen", *Institut für Werkstofftechnik, Universität Bremen, 01.07.2004.*
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71. J. Eckert, J. Das, G. He, W. Löser, E. Ma, Y. Li, M.L. Sui, T.G. Woodcock, A. Gebert, "In-Situ Formed Bulk Nanostructured Ti-Base Composites", *11th Int. Symp. on Metastable, Mechanically Alloyed and Nanocrystalline Materials, , 23.08.2004.*
72. J. Eckert, "Recent Advances in the Design of Metastable Materials for Engineering Applications", *Kolloqium des Max-Planck-Instituts für Eisenforschung Düsseldorf, 04.10.2004.*
73. J. Eckert, "Nanostructured Composite Materials with Improved Mechanical Properties", *Workshop on Nanostructured Materials - Synthesis, Characterization, Functionality, University "Politechnica" of , , 24.11.2004.*
74. J. Eckert, "Synthesis and Properties of Bulk Nanostructure/Dendrite Ti-Base Composites", *13th Int. Symp. on Processing and Fabrication of Advanced Materials , 08.12.2004.*
75. J. Eckert, "Microstructure Design of Bulk Glassy / Nanostructured Composites", *Metallkundlich-Metallphysikalisches Kolloqium, Institut für Metallkunde und Metallphysik, RWTH Aachen, 11.01.2005.*
76. J. Eckert, " Metastabile Phasen als Basis neuer Werkstoffe", *Kolloqium Werkstoffsynthese und Analytik, IFW Dresden, 27.01.2005.*
77. J. Eckert, J. Das, K.B. Kim, F. Baier, M. Calin, Z.F. Zhang, G. He, M.B. Tang, W.H. Wang, "Ductilization of Bulk Metallic Glasses and Nanostructured Materials", *4th Int. Conf. on Bulk Metallic Glasses, , 02.05.2005.*
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79. J. Eckert, J. Das, K.B. Kim, M. Kusy, N. Radtke, F. Baier, Z.F. Zhang, G. He, A. Gebert, "Bulk Nanostructured Composites: Solidification, Microstructure and Deformation Behavior", *12th Int. Conf. on Rapidly Quenched & Metastable Materials (RQ 12), , 22.08.2005.*
80. J. Eckert, "Design of Metastable Materials for Engineering Applications", *Seminar at the Advanced Materials Research Center, Korea Institute of Science and Technology (KIST), , 29.08.2005.*
81. J. Eckert, "Advanced Materials Based on Metastable Phases ", *Seminar at the Center for Noncrystalline Materials, Department of Metallurgical Engineering, Yonsei University, Seoul, Korea, 29.08.2005.*

82. J. Eckert, "Metastabile Phasen für neue Hochleistungswerkstoffe", *TTN-Jahrestagung - Automobile Kompetenzen, Potentiale und Kerspektiven, Kassel, 09.11.2005.*

83. J. Eckert, J. Das. K.B. Kim, F. Baier, "Microstructure Design for Ductilization of Nanocrystalline and Amorphous Metals", *MRS Fall Meeting, , 28.11.-02.12.2005.*

X) Contributed Presentations at Conferences, Symposia and Seminars:

373 contributed oral and poster presentations at national and international Conferences, Symposia and Seminars (since 1987).