Program

Nanomechanical Testing in Materials Research and Development VI

October 1 - 6, 2017

Dubrovnik, Croatia

Conference Chair

Karsten Durst
Technical University Darmstadt
Germany

Engineering Conference International
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Previous conferences in this series

Instrumented Indentation Testing in Materials Research & Development
October 9 – 15, 2005
Crete, Greece
Conference Chairs:
George M. Pharr, University of Tennessee, USA
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Nanomechanical Testing in Materials Research & Development II
October 11 - 16, 2009
Barga, Italy
Conference Chair:
Mathias Göken, University Erlangen-Nurnberg, Germany

Nanomechanical Testing in Materials Research & Development III
October 9 – 14, 2011
Lanzarote, Canary Islands, Spain
Conference Chair:
Gerhard Dehm, University of Leoben, Austria

Nanomechanical Testing in Materials Research & Development IV
October 6 - 11, 2013
Albufeira, Portugal
Conference Chair:
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Nanomechanical Testing in Materials Research & Development V
October 4-9, 2015
Albufeira, Portugal
Conference Chair:
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NOTES

- *Technical Sessions and the Tutorial Session will be in Soderini 3 (Level R). Poster sessions will be in Giardino (Level 0).*
- *Dinners will be in Giardino. Lunches on Monday and Wednesday will be in the Origano Restaurant. Lunch on Thursday will be in Giardino.*
- *Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, PDAs, watches) is strictly prohibited during the technical sessions, unless prior permission has been granted by the author and ECI.*
- *Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).*
- *Speakers – Please leave at least 3-5 minutes for questions and discussion.*
- *Please do not smoke at any conference functions.*
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- *After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.*

Sunday, October 1, 2017

08:30 - 09:00	Check-in for Optional Tutorial Session
09:00 - 13:00	Tutorial Session
	Advances in high temperature nanoindentation Jeff Wheeler, ETH Zurich, Switzerland
	Analysis of thermally activated processes during indentation Verena Maier-Kiener, Montanuniversität Leoben, Austria
	Industrial application of small scale mechanical testing Johann Michler, EMPA, Switzerland
13:00 - 14:00	Lunch (on your own)
14:00 - 15:45	Conference check-in (Pre-function area)
15:45 - 16:00	**Welcome and Conference Overview** Conference Chair: Karsten Durst ECI Technical Liaison: Larry Kabacoff
16:00 - 17:00	**Keynote: Integrated experimental and simulation analysis of stress and strain partitioning in dual phase steel** Dierk Raabe Max-Planck-Institut für Eisenforschung GmbH, Düsseldorf, Germany
17:00 - 19:00	**Session I: Introducing nanomechanical testing in research and development**
17:00 - 17:30	*Highlight:* **Quantifying the commonalities in structure and plastic deformation in disordered materials** Daniel S. Gianola, University of California, Santa Barbara, USA
17:30 - 17:50	**Plastic deformation of sub-micron Al and Be wires: A TEM and in situ TEM study** Marc Legros, CEMES-CNRS, Toulouse, France
17:50 - 18:10	**The brittle-ductile transition of tungsten single crystals at the micro-scale** Johannes Ast, EMPA Swiss Federal Laboratories for Materials Science and Technology, Switzerland
19:00 - 20:00	Welcome Reception
20:00 - 21:30	Dinner (Giardino)

Monday, October 2, 2017

07:30 - 09:00	Breakfast Buffet
09:00 - 13:00	**Session II: Small scale fracture mechanics**
09:00 - 09:40	*Invited* **Fracture mechanics of microsamples** Reinhard Pippan, Erich Schmid Institute of Materials Science of the Austrian Academy of Sciences, Austria
09:40 - 10:00	**In situ HR-EBSD during micro-mechanical testing for microstructure, stress and plastic deformation characterizations in material** Xavier Maeder, EMPA - Swiss Federal Laboratories for Materials Science and Technology, Switzerland
10:00 - 10:20	**Micromechanics of fully lamellar TiAl alloys** Jon Molina-Aldareguia, IMDEA Materials Institute, Spain
10:20 - 10:40	**In situ stable fracture of ceramic interfaces** Finn Giuliani, Imperial College London, UK
10:40 - 11:10	Coffee break
11:00 - 11:30	**Miniaturized fracture experiments on pearlitic steel: Challenges and solutions** Gerhard Dehm, Max-Planck-Institut für Eisenforschung GmbH, Düsseldorf, Germany
11:30 - 11:50	**Understanding the performance of nano-structured ferritic alloys through micro-mechanical testing** David Armstrong, University of Oxford, UK
11:50 - 12:10	**Using simulations to investigate the apparent fracture toughness of microcantilevers** Steffen Brinckmann, Max-Planck-Institut für Eisenforschung, Düsseldorf, Germany
12:10 - 12:30	**Fracture of silicon at low length scales** Jeffrey M. Wheeler, ETH Zurich, Switzerland
12:30 - 12:50	**Elastic-plastic fracture toughness of electrodeposited Ni-W thick films using in-situ microcantilever bend tests** Denise Yin, Lehigh University, USA
13:00 - 14:30	Lunch
14:30 - 16:30	Networking / Time for *ad hoc* discussions

Monday, October 2, 2017 (continued)

16:30 - 19:00	**Session III: Coatings and small-scale fracture mechanics**
16:30 - 16:50	**Multiple cracking events in metal bi-layers on polymer substrates** Megan J. Cordill, Erich Schmid Institute of Materials Science, Leoben, Austria
16:50 - 17:10	**Mechanical properties and failure of Ag nanowire transparent electrodes studied by means of in situ tensile testing** Nadine Schrenker, University Erlangen-Nürnberg (FAU), Germany
17:10 - 17:30	**Fracture behavior of metallic thin films as evaluated by bulge-tests and in situ TEM deformation experiments** Mathias Göken, FAU Erlangen-Nürnberg, Germany
17:30 - 17:50	**Micro-mechanical testing of transition metal (oxy)nitride coatings** James S.K-L. Gibson, RWTH Aachen University, Germany
18:20 - 19:00	*Invited* **Filamentary growth of metals: Microstructure and properties of (nano-) whiskers** Gunther Richter, Max-Planck-Institute for Intelligent Systems, Stuttgart, Germany
19:00 - 20:00	Poster Preview I
20:00 - 21:30	Dinner
21:30 - 23:00	**Poster Session I with Social Hour**

Tuesday, October 3, 2017

07:30 - 09:00	Breakfast Buffet
09:00 - 13:00	**Session IV: In-situ Experiments II**
09:00 - 09:40	*Invited* **Combined in situ mechanical testing and scale-bridging 3D analysis of nanoporous gold** Erdmann Spiecker, University Erlangen-Nürnberg, Germany
09:40 - 10:00	**Plastic deformation and anisotropy of long-period-stacking-ordered structures in Mg-Zn-Y alloys** Stefanie Sandlöbes, RWTH Aachen University, Germany
10:00 - 10:20	**Mechanical hysteresis of the MAX phase Ti_2AlN: A nano-mechanical testing study** Christophe Tromas, Institut Pprime - Université de Poitiers, France
10:20 - 10:40	**Plasticity of an atomically layered crystal: A combined nanomechanical and ab initio study on Mo_2BC** Sandra Korte-Kerzel, RWTH Aachen University, Germany
10:40 - 11:10	Coffee break
11:10 - 11:30	**The impact of grain boundary character on the size dependence of Bi-crystals** Christoph Kirchlechner, Max-Planck-Institut für Eisenforschung, Düsseldorf, Germany
11:30 - 11:50	**Mechanical testing of nanotwinned alloys** Andrea M. Hodge, University of Southern California, USA
11:50 - 12:10	**Mechanical testing of copper and copper alloy micropillars containing a single twin boundary** Benoit Merle, University Erlangen-Nürnberg (FAU), Germany
13:00 - 19:00	Boxed lunch and optional excursion
19:00 - 20:15	Dinner
20:15 - 21:00	Poster Preview II
21:00 - 23:00	Poster Session II with Social Hour

Wednesday, October 4, 2017

07:30 - 09:00	Breakfast Buffet
09:00 - 13:00	**Session V: New Instrumentation, Methods and Development**
09:00 - 09:30	*Highlight* **Interface strength and toughness measurements in multi-layered systems** Daniel Kiener, Erich Schmid Institute, Montanuniversität Leoben, Austria
09:30 - 09:50	**Room temperature plasticity in sub-micrometer thermally grown oxide scales** Magnus Hörnqvist Colliander, Chalmers University of Technology, Sweden
09:50 - 10:10	**Femtosecond laser and FIB: A revolutionary approach in rapid micro-mechanical sample preparation** Manuel J. Pfeifenberger, Montanuniversität Leoben, Austria
10:10 - 10:30	**Microscale additive manufacturing of metal – mechanical properties** Alain S. Reiser, ETH Zurich, Switzerland
10:30 - 11:00	Coffee Break
11:00 - 11:30	*Highlight* **Spatially resolved depth profiling of residual stress by micro-ring-core method** Marco Sebastiani, Roma TRE University, Italy
11:30 - 11:50	**Novel in situ nanomechanical tests: a new insight into the hydrogen embrittlement** Afrooz Barnoush, Norwegian University of Science and Technology, Norway
11:50 - 12:10	**Development and application of an in situ-SEM nanoindenter coupled with electrical measurements** Fabien Volpi, Univ. Grenoble Alpes, CNRS, SIMaP Lab., Grenoble, France
12:10 - 12:30	**Interfacial adhesion of compositional gradient ternary FCC alloy films** Rachel L. Schoeppner, EMPA Swiss Federal Laboratories for Materials Science and Technology, Switzerland
12:30 - 12:50	**Strain rate influence on the thermo-mechanical deformation behavior of Aluminum thin films** Johannes Zechner, KAI GmbH, Villach, Austria
13:00 - 14:30	Lunch
14:30 - 16:30	Networking Time / Time for *ad hoc* discussions

Wednesday, October 4, 2017 (continued)

16:30 - 19:00	**Session VI: Small scale testing of advanced materials**
16:30 - 16:50	**Nanoscale compressive deformation mechanisms and yield properties of hydrated bone extracellular matrix** Jakob Schwiedrzik, EMPA - Swiss Federal Laboratories for Materials Science and Technology, Switzerland
16:50 - 17:10	**Cyclic indentation test to characterize viscoelastic behavior of polymers** Olga Smerdova, Institut Pprime - Université de Poitiers, France
17:10 - 17:30	**Probing crystalline phases in cubic boron nitride as a function of boron content by massive nanoindentation and microsample testing** Joan Josep Roa Rovira, Universidad Politecnica de Cataluña, Barcelona, Spain
17:30 - 17:50	**Anisotropic deformation of ZrB_2 ceramic grains during in-situ micropillar compression up to 500°C** Tamás Csanádi, IMR-SAS, Slovakia
17:50 - 18:10	**Room temperature and high temperature micromechanical testing of SiC-SiC fiber composites for nuclear fuel cladding applications** Yevhen Zayachuk, Department of Materials, University of Oxford, UK
18:10 - 18:30	**Nanoindentation of Au nanoparticles – A combined experimental/computational multiscale study** Dan Mordehai, Technion - Israel institute of Technology, Israel
18:30 - 18:50	**A new type of superelastic and shape memory materials: $ThCr_2Si_2$-structured novel intermetallic compounds at small length scales** Seok-Woo Lee, University of Connecticut, USA
20:00 - 22:00	Conference Dinner

Thursday, October 5, 2017

07:30 - 09:00	Breakfast Buffet
09:00 - 13:00	**Session VII: New developments in indentation testing**
09:00 - 09:30	*Highlight* **Wide dynamic range 2-D nanoindentation: Friction and partial slip at contacts** John B. Pethica, Trinity College Dublin, Ireland
09:30 - 09:50	**Investigation of contact-induced near-surface materials transformations using nanomechanical testing.** Guillaume Kermouche, Ecole des Mines de Saint-Etienne, France
09:50 - 10:10	**New methods for nanoindentation mapping to account for size dependence** Andy Bushby, Queen Mary University of London, UK
10:10 - 10:30	**Scratching the surface of Lateral Size Effects (LSE): A critical comparison between indentation and scratch hardness size effects** Nigel Jennett, Coventry University, UK
10:30 - 11:00	Coffee Break
11:00 - 11:20	**The formation and evolution of cracks during nanoindentation of fused quartz** Brittnee A. Mound, University of Tennessee, USA
11:20 - 11:40	**Constitutive modeling of indentation cracking in fused silica** Sebastian Bruns, TU Darmstadt, Germany
11:40 - 12:00	**Constant contact stiffness indentation relaxation test** Jean-Luc Loubet, CEMES-CNRS, Ecully, France
12:00 - 12:20	**Spherical nanoindentation – advancements and prospects towards its application as a multifunctional testing technique** Alexander Leitner, Montanuniversität Leoben, Austria
12:20 - 12:40	**Identification of macroscopic hardening law through spherical indentation: definition of an average representative strain and a confidence domain.** Charbel Moussa, MINES ParisTech, France
12:40 - 13:00	**Size effect observed in spherical indentation test of single crystal copper** Stanisław Kucharski, Institute of Fundamental Technological Research, Polish Academy of Science, Poland
13:00 - 14:30	Lunch
14:30 - 16:30	**Session VIII: New instrumentation and Developments** *Sponsored by Micro Materials Limited*
14:30 - 14:50	**Temperature dependence of indentation size effects, pile-up and strain rate sensitivity in polycrystalline tungsten from 25-950 C** Ben D. Beake, Micro Materials Ltd, UK

Thursday, October 5, 2017 (continued)

14:50 - 15:10	**Nanoindentation at elevated temperatures** Warren C. Oliver, Nanomechanics, Inc., Oak Ridge, USA
15:10 - 15:30	**Microcompression high cycle fatigue tests up to 10 million cycles** Gaurav Mohanty, Alemnis, Thun, Switzerland
15:30 – 15:50	**The effect of thermally induced stresses on indentation experiments** Ude D. Hangen, Bruker BNS, USA
16:30 - 19:00	**Session IX: Deformation mechanisms**
16:30 - 16:50	**Nanoindentation study of the temperature dependence of plastic instability in Al alloys.** Henry Ovri, Helmholtz Zentrum Geesthacht, Germany
16:50 - 17:10	**Determination of mechanical properties of different sized silicon and silica nanowires tested in SEM** Nicole Wollschläger, Bundesanstalt für Materialforschung und –prüfung, Germany
17:10 - 17:30	**Initiation of fatigue damage in ultra-fine grained thin films: Schmid, Taylor or Hall-Petch?** Oleksandr Glushko, Montanuniversität Leoben, Austria
19:00 - 21:00	Dinner followed by Social Hour

Friday, October 6, 2017

07:00 – 09:00	Breakfast and Departures

Poster Presentations

1. **Bulk metallic glass composites: microstructural influences on mechanical properties**
   Lisa Kraemer, Erich Schmid-Institute of Materials Sciences, Austrian Academy of Sciences; OEAW, Austria

2. **Locally resolved fracture mechanisms by using in-situ microscopic testing**
   Markus Alfreider, Erich Schmid Institute for Materials Science, Austrian Academy of Science, Austria

3. **High-resolution structural-mechanical characterization and simulation of novel barrier coatings**
   André Clausner, Fraunhofer IKTS, Germany

4. **Evolution of thickness dependent buckle geometries**
   Alice Lassnig, Erich Schmid Institute of Materials Science, Austrian Academy of Sciences; Department Materials Physics, Montanuniversität Leoben, Austria

5. **Changes in amorphous silica mechanical properties induced by femtosecond laser irradiation**
   Guillaume Kermouche, Ecole des Mines de Saint-Etienne, France

6. **Residual stress characterization in DLC coating by focused ion beam milling and finite element modeling**
   Sergio Sao Joao, Ecole des Mines de Saint-Etienne, LGF UMR5307 CNRS, France

7. **Combining high strength and moderate ductility in wear resistant coatings: a MO_2BC study**
   Rafael Soler, Max-Planck-Institut für Eisenforschung, Germany

8. **Nanoindentation and optical properties of transparent metal oxide multilayers**
   Chelsea D. Appleget, University of Southern California, USA

9. **Mechanical behavior and size effects of polymer/amorphous NiB composites with 3D micro-architectures**
   Johann Michler, EMPA, Switzerland

10. **Effects of indenter geometry on micro-scale fracture toughness measurement by Pillar splitting**
    Marco Sebastiani, Roma TRE University, Italy

11. **High-speed nanoindentation for fast mechanical property mapping and surface patterning,**
    Riccardo Moscatelli, University of Rome "Roma TRE", Italy

12. **Mechanical testing of twinned copper and copper alloy micropillars**
    Sebastian Krauß, FAU Erlangen-Nürnberg, Germany

13. **Small-scale insights into superplasticity using micromechanical testing methods**
    Patrick Feldner, Materials Science & Engineering, Institute I, Friedrich-Alexander-University Erlangen-Nuremberg (FAU), Germany

14. **Ductile-brittle-transition of flash annealed Fe-based metallic glass ribbons**
    Christian Minnert, TU Darmstadt, Germany

15. **Indentation size effect and 3D dislocation structure evolution in (001) oriented $SrTiO_3$: HR-EBSD and etch-pit analysis**
    Farhan Javaid, Physical Metallurgy Division, Institute of Materials Science, Technische Universität Darmstadt, Germany

16. **In-situ Bragg coherent X-ray diffraction during tensile testing of an individual Au nanowire**
    Jungho Shin, University of Pennsylvania, USA

17. **A model for size-effects in flat punch nanoindentation**
    Christopher James Campbell, University of Leicester, United Kingdom

18. **WITHDRAWN**

19. **Portevin-Le Chatelier effect in $AlMg_3$% studied using elevated temperature nanoindentation**
    Gaurav Mohanty, EMPA, Alemnis AG, Switzerland

20. **An in-situ indentation system for high dynamic nanomechanical measurements**
    Damian Frey, Alemnis, Switzerland

21. **Superelasticity and micaceous plasticity of the novel intermetallic compound $CaFe_2As_2$ at small length scales**
    John T. Sypek, University of Connecticut, USA

22. **Ultra-high elastic strain energy storage in hybrid metal-oxide infiltrated polymer nanocomposites**
    Keith Dusoe, University of Connecticut, USA

23. **Micro-fracture experiments on nanocomposite hard coatings**
    Matthias Bartosik, TU Wien, Austria

24. **Deformation behavior of gold/copper multilayer systems**
    Hauke L. Honig, TU Ilmenau, Germany

25. **Determination of stress-strain relation using instrumented ball indentation at micron scale**
    Alexey Useinov, TISNCM, Russia

26. **New Tools to solve known problems at critical nanoindentation measurements**
    Wolfgang Alfred Stein, SURFACE Nanometrology, Germany

27. **Nanoindentation tests using flat punch indenter - Contact formation and tilt correction**
    Dennis Bedorf, SURFACE, Germany

28. **Microcompression experiments on glasses - strain rate sensitive cracking behavior**
    Christoffer Zehnder, RWTH Aachen University, Germany

29. **Room temperature deformation mechanisms of the C14 Laves Phase in the Mg-Al-Ca system**
    Christoffer Zehnder, RWTH Aachen University, Germany

30. **Using impact-nanoindentation to test glasses at high strain rates and room temperature**
    Christoffer Zehnder, RWTH Aachen University, Germany

31. **Observing the size effect in copper-chromium-zirconium using spherical indentation**
    Alexandra Joanna Cackett, Queen Mary University of London, UK Atomic Energy Authority, United Kingdom

32. **WITHDRAWN**

33. **Determination of Mechanisms of Abrasion in WC/Co hard metals by In situ micro-tribology experiments**
    Mark Gee, National Physical Laboratory, United Kingdom

34. **WITHDRAWN**

35. **Analyzing the onset of plasticity in Fe-3wt.%Si**
    Nousha Kheradmand, NTNU, Norway

36. **Hydrogen enhanced cracking studies by in-situ electrochemical micro cantilever bending test**
    Tarlan Hajilou, NTNU, Norway

37. **Real-time in situ micro-mechanical testing of hard metals using FIB-SEM**
    Helen Jones, National Physical Laboratory, United Kingdom

38. **WITHDRAWN**

39. **Hydrogen-microstructure interactions in bcc FeCr alloys by in-situ nanoindentation**
    Maria Jazmin Duarte Correa, Max-Planck-Institut für Eisenforschung GmbH, Germany

40. **Micropillar compression of hexagonal and cubic $NbCo_2$ Laves phases**
    Wei Luo, Max-Planck-Institut für Eisenforschung GmbH, Germany

41. **WITHDRAWN**

42. **Indentation behavior of single-crystalline tungsten**
    Jin Wang, Karlsruhe Institute of Technology (KIT), Institute of Applied Materials （IAM）, Germany

43. **Nanoindentation of ferritic-martensitic steels – a comparative study of static and dynamic measurements**
    Ana Ruiz Moreno, Joint Research Centre. European Commission, Netherlands

44. **Monitoring the breath through mechanical movements of the chest using continuous wave bioradar system**
    Giovanni Cerasuolo, Italian Aerospace Research Centre, Italy

45. **Heat flux gauge calibration using the blackbody**
    Giovanni Cerauolo, Italian Aerospace Research Centre, Italy

46. **Micromechanical testing of Mo-B-C layers prepared by magnetron sputtering**
    Jiří Buršík, Institute of Physics of Materials, Czech Academy of Sciences, Czech Republic

47. **Indentation modulus and Young's modulus of Cu-Cr-Zr alloy at macro-scale level**
    Alessandro Schiavi, INRIM - National Institute of Metrological Research, Italy

48. **Effect of pre-existing dislocations on the strength of gold at very small scales**
    Paula O. Guglielmi, Helmholtz-Zentrum Geesthacht, Experimental Materials Mechanics, Institute of Materials Research, Germany

49. **WITHDRAWN**

50. **From Reactive multilayer nanofoils to self-healing metallic systems**
    Stefano Danzi, ETH Zurich, Laboratory for NanoMetallurgy, Switzerland

51. **Portevin-Le Chatelier effect studied at small scale**
    Yuan Xiao, Laboratory for Nanometallurgy, ETH Zurich, Switzerland

52. **Plasticity and size effects in germanium: From cryogenic to elevated temperatures**
    Ming Chen, Laboratory for Nanometallurgy (LNM), Department of Materials, ETH Zurich, Switzerland

53. **An almost unifying theory for grain boundary-based plasticity**
    Marc Legros, CEMES-CNRS, France

54. **Thermo oxidative aging of polymers and polymer-matrix composites studied with cyclic indentation**
    Olga Smerdova, ENSMA, France

55. **Fracture toughness of thermal barrier coatings determined by micro cantilever bending tests**
    Sven Giese, University Erlangen-Nuremberg, Germany

56. **WITHDRAWN**

57. **Experimental design for uniaxial tensile measurements at the microscale**
    Daniele Casari, EMPA, Swiss Federal Laboratories for Materials Science and Technology, Switzerland

58. **Nanomechanical test specimen preparation techniques by microfabrication and two-photon lithography to avoid FIB induced Ga implantation damage**
    Laszlo Pethö, EMPA, Switzerland

59. **Indentation relaxation test: Opportunities and limitations**
    Paul Baral, Ecole Centrale de Lyon, France

60. **A new push-pull sample design for microscale mode 1 fracture toughness measurements under uniaxial tension**
    Johann Jakob Schwiedrzik, EMPA Swiss Federal Laboratories for Materials Science and Technology, Switzerland

61. **In situ micromechanical testing inside the scanning electron microscope at subambient temperatures**
    Johann Jakob Schwiedrzik, EMPA Swiss Federal Laboratories for Materials Science and Technology, Switzerland

62. **Small-Scale Mechanical Testing of Nuclear Structural Materials**
    Vineet Bhakhri, Canadian Nuclear Laboratories, Chalk River, Canada

63. **Size effects in electrodeposited Ni – coatings**
    Michael Griepentrog, Bundesanstalt für Materialforschung und -prüfung BAM, Germany

64. **High temperature nanoindentation up to 800°C for characterizing high temperature properties of materials**
    Nicholas Randall, Anton Paar TriTec, Switzerland

65. **Nanomechanical testing of Ti/Ni multilayer thin films**
    Vilma Bursikova, Masaryk University, Czech Republic

66. **Methods of actual indenter shape determination**
    Jaroslav Čech, Czech Technical University in Prague, Czech Republic

67. **Influence of the Interface and the microstructural length scale on the grid indentation**
    Petr Hausild, Czech Technical University in Prague, Czech Republic

68. **Limitation of Hall-Petch relationship for interpreting scratch on polycrystalline copper using spherical indenter**
    Xiaodong Hou, Coventry University, United Kingdom

69. **WITHDRAWN**

70. **Annealing effect on the Fracture Toughness of CrN/TiN Superlattice Systems**
    Rainer Hahn, Christian Doppler Laboratory for Application Oriented Coating Development at the Institute of Materials Science and Technology, TU Wien, Austria

71. **(Nano-)Mechanical properties and deformation mechanisms of the topologically closed packed Fe-Mo55 µ-Phase at room temperature**
    Sebastian Schröders, RWTH Aachen University, Germany

72. **XFEM modelling of ball indentation cracking in a-C:H Coatings**
    Sebastian Bruns, TU Darmstadt, Germany

73. **Investigating the local fatigue properties of materials by dynamic micropillar Compression**
    Benoit Merle, University Erlangen-Nürnberg (FAU), Germany

74. **Influence of modulus-to-hardness ratio and harmonic parameters on continuous stiffness measurement during nanoindentation**
    Benoit Merle, University Erlangen-Nürnberg (FAU), Germany