Nanomechanical Testing in Materials Research and Development VIII

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Sunday, October 2, 2022

09:30 – 10:00	Check-in for Optional Tutorial Session (Lastovo – conference office)
10:00 – 13:00	**Tutorial Sessions (parallel)**
	Analyzing dislocations in the TEM...N/A Marc Legros, CEMES-CNRS, France
	Studying rate and temperature dependence in nanomechanics...N/A Verena Maier-Kiener, Montanuniversitat Leoben, Austria
	Processing and analyzing micrographs with artificial intelligence...N/A Setareh Medghalchi, RWTH Aachen University, Germany
13:00 – 14:00	Lunch (on your own)
15:00 – 16:30	Check-in for Conference (Lastovo – conference office)
	Session I: Nanomechanics under extreme conditions Chair: Sandra Korte-Kerzel, RWTH Aachen University, Germany
16:30 – 16:40	**Conference Welcome** Sandra Korte-Kerzel, RWTH Aachen University, Germany Larry Kabacoff, ECI Technical Liaison
16:40 – 17:20	**Progress in the development of high strain rate nanoindentation testing...1** George Pharr, Texas A&M University, USA
17:20 – 17:50	**In situ micromechanics during hydrogen charging: Effect of diffusible hydrogen on BBC Fe-based alloys and hydrogen protection through hydrogen barrier coatings...2** Maria Jazmin Duarte Correa, MPIE, Germany
17:50 – 18:10	**In situ deformation observation via EBSD and EDS during high temperature tensile testing...3** Sebastian Krauss, Carl Zeiss Microscopy GmbH, Germany
18:10 – 18:30	**In-situ nanomechanical testing at elevated humidities...4** Igor Zlotnikov, B CUBE, Germany
18:30 – 21:30	Opening Reception and Dinner (Gooshter Beach Club)

Monday, October 3, 2022

07:30 – 09:00	Breakfast buffet
	Session II: Crystal plasticity Chair: Marco Sebastiani, Roma TRE University, Italy
09:00 – 09:40	**Keynote** **On the contribution of nanomechanical testing to the study of Earth mantle deformations...5** Patrick Cordier, University of Lille, France
09:40 – 10:00	**Orientation-dependent plastic deformability in micropillar compression of oxide ceramics...6** Hiroshi Masuda, University of Tokyo, Japan
10:00 – 10:30	**Solid solution hardening effects on structural evolution and mechanical properties of nanostructured high entropy alloys...7** Karsten Durst, Technical University of Darmstadt, Germany
10:30 – 10:50	**Plastic deformation of microsamples: Intermittent dislocation avalanches and their acoustic emission...8** David Ugi, Eötvös Lorand University, Hungary
10:50 – 11:30	Coffee Break
11:30 – 12:00	**Plasticity of the C_{15}-$CaAl_2$ Laves phase at room temperature...9** Carl F. Kusche, RWTH Aachen, Germany
12:00 – 12:20	**On the mechanistic origin of the enhanced strength and ductility in rare earth-based Mg alloys...10** Henry Ovri, Helmholtz Zentrum Hereon, Germany
12:20 – 12:50	**Orientation, temperature and strain rate effects in deformation twinning of magnesium...11** Xavier Maeder, EMPA, Switzerland
13:00 – 14:30	Lunch
14:30 – 16:30	Networking / Time for *ad hoc* discussions
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16:30 – 16:50	**Deformation twinning in Cr_2AlC MAX phase single crystals: A nanomechanical testing study...12** Christophe Tromas, Université de Poitiers, France
16:50 – 17:10	**Micromechanical study of a precipitation-hardened dual phase high-entropy alloy...**N/A Szilvia Kalacska, University of St.-Etienne, France
17:10 – 17:30	**Miniaturization effects on the tensile behavior of multicrystalline and polychristalline nickel-based superalloy: Influence of grain size, free surface and precipitation state...13** Damien Texier, Institut Clément Ader, France

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17:30 – 17:50	**Dislocation mechanisms of toughening in Cu-graphene nanolayered composite...N/A** Subin Lee, KIT, Germany
17:50 – 18:10	Short Coffee Break
18:10 – 18:30	**Plasticity of topologically close-packed phases in the Fe-Ta(-Al) system...14** Christina Gasper, RWTH Aachen, Germany
18:30 – 18:50	**Imaging modalities of mechanical microscopy...N/A** Jeffrey M. Wheeler, FemtoTools AG, Switzerland
19:00 – 20:00	**Poster Preview I**
20:00 – 21:30	Dinner
21:30 – 23:00	**Poster Session I with social period**

Tuesday, October 4, 2022

07:30 – 08:30	Breakfast buffet
	Session III: Fracture Chair: Gerhard Dehm, MPIE, Germany
08:30 – 09:00	**Tailoring thin-film mechanical fragmentation properties of hybrid atomic/molecular-layer-deposited materials...15** Ivo Utke, EMPA, Switzerland
09:00 – 09:20	**Micro-scale damage tolerance studies in ferroelectric barium titanate thin films...16** Nidhin George Mathews, Indian Institute of Technology, Bombay, India
09:20 – 09:40	**Fracture properties of CrN hard coatings: Influence of the microstructure, alloying elements, and coating architecture...17** Rainer Hahn, TU Wien, Austria
09:40 – 10:00	**Micro-mechanical approach of the intergranular stress corrosion cracking of austenitic stainless steels in PWR environment...18** Rachma Azihari, CEA Sarclay, France
10:00 – 10:20	**Size effects in fracture mechanics: A detailed investigation on crack growth at the micro- and mesoscale...19** Jutta Luksch, Saarland University, Germany
10:20 – 11:00	Coffee Break
11:00 – 11:30	**Environmental reliability and crack propagation resistance of 3d-printed ALD-coated nano-ceramics...20** Marco Sebastiani, Roma TRE University, Italy
11:30 – 11:50	**Fracture behaviour of Ti/TiN multilayer thin film modeling and experimental validation...21** Ashwini Kumar Mishra, Indian Institute of Technology, Bombay, India
11:50 – 12:10	**Grain size tailoring of tungsten copper nanocomposites to affect local fracture characteristics...22** Klemens Schmuck, Montanuniversität Leoben, Austria
12:10 – 12:30	**Dislocation-based competition of plasticity and cracking in oxides: Understanding and application...23** Xufei Fang, Technical University of Darmstadt, Germany
12:35 – 13:30	Lunch
13:45	Meet up at the front lobby of the hotel for the excursion.
	Buses leave promptly at 13:50
13:50 – 18:00	Excursion

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Session IV: Biological Materials
Chair: Christian Motz, Saarland University, Germany

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Nanomechanical characterisation of polymer nanotubes for application as 'soft' mechanical interfaces for biology...24
Sohini Kar-Narayan, University of Cambridge, United Kingdom

19:25 – 19:55 **Strong, stiff & auxetic - Lessons learned from a fascinating biological material...25**
Daniel Kiener, Montanuniversität Leoben, Austria

20:15 – 22:00 Dinner

Wednesday, October 5, 2022

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09:30 – 09:50	**Two photon lithography for synthesis of fracture mechanical specimen...27** Alexander Jelinek, Montanuniversität Leoben, Austria
09:50 – 10:20	**High-temperature scanning indentation: A new technique to assess microstrutural changes along thermal ramping...28** Gabrielle Tiphene, École centrale de Lyon, France
10:20 – 10:40	**From microlattices to 3d microprinting of multiphase micro-components: Resolution limits and mechanical properties under extreme conditions...29** Johann Michler, EMPA Thun, Switzerland
10:40 – 11:00	**Additive micromanufacturing and dynamic characterization of copper microlattices...30** Rajaprakash Ramachandramoorthy, MPIE, Germany
11:00 – 11:30	Coffee Break
	Session VI: In-situ nanomechanical testing Chair: Maria Jazmin Duarte Correa, Max-Planck-Institut für Eisenforschung GmbH, Germany
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12:00 – 12:20	**Deformation mechanism of cerium oxide nanocubes - an in situ transmission electron microscopy study...32** Karine Masenelli-Varlot, University of Lyon, France
12:20 – 12:40	**Deformation mechanisms of hierarchically structured 2D single-crystal materials revealed by real-time high-resolution in-situ nanomechanical testing...33** Tyler Dolmetsch, Florida International University, USA
12:40 – 14:30	Lunch
14:30 – 16:30	Networking / Time for *ad hoc* discussions
	Session VII: New Methods & Analyses Chair: Gaurav Mohanty, Tampere University, Finland
16:30 – 17:00	**Challenges in the phase identification of steels using unsupervised clustering of nanoindentation data...34** Gerhard Dehm, MPIE, Germany

Wednesday, October 5, 2022 (continued)

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17:20 – 17:40	**A mathematical framework for high strain rate nanoindentation testing...N/A** Warren Oliver, KLA, USA
17:40 – 18:00	Short Coffee Break
18:00 – 18:20	**Correcting for substrate elasticity contributions in depth-sensing indentation of embedded particles...36** Alejandra Slagter, EPFL, Switzerland
18:20 – 18:40	**Mechanics of elastic contact with an interface between adjacent materials...37** Kian Tadayon, TU Dresden, Germany
18:40 – 19:00	**In-situ monitoring of the contact area during indentation creep testing...38** Ude Hangen, Bruker BNS, United States
19:00 – 20:00	**Poster Preview II**
20:00 – 21:30	Dinner
21:30 – 23:00	**Poster Session II with social period**

Thursday, October 6, 2022

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	Session VIII: Nanomechanics under Complex Stress States Chair: George Pharr, Texas A&M University, USA
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09:20 – 09:40	**Brittle to ductile transition in metal/oxide nanolaminates on flexible substrates under uniaxial and biaxial tension...40** Barbara Putz, EMPA Thun, Switzerland
09:40 – 10:00	**A new method to measure shear surface mechanical properties...41** Gaylord Guillonneau, University of Lyon, France
10:00 – 10:20	**Micro-shear of silicon: Elastic strain analysis using digital image correlation...42** Carmen Maria Lauener, ETH Zürich, Switzerland
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11:20 – 11:40	**Phase transformations and local deformation mechanisms - A case study on Cu 20 m.% Sn...44** Lea Lumper, Montanuniversität Leoben, Austria
11:40 – 12:00	**Role of grain boundary on the deformation of micropillars...45** Manmath Dash, University of Birmingham, United Kingdom
12:00 – 12:20	**The ductility of thin freestanding metallic films investigated by in-situ TEM / AFM nanomechanical testing...46** Benoit Merle, University of Kassel, Germany
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Chairs: Karsten Durst, Technical University of Darmstadt, Germany

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16:20 – 16:40 **Temperature-dependent dynamic plasticity of micro-scale fused silica...50**
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16:40 – 17:00 **Fracture propagation in glassy polymers: From nanometer to centimeter...51**
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17:20 – 17:50 **Evidence of electron-irradiation activated creep in amorphous olivine at room temperature...52**
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17:50 – 18:10 **Full-field strain around propagating shear bands and von mises criteria for metallic glasses...53**
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18:10 – 18:30 **Plastic flow and structural heterogeneities in silicate glasses - A high throughput investigation...54**
Etienne Barthel, ESPCi Paris / Sorbonne University, France

18:30 – 18:50 **Densification of polymer glass film under combined high pressure and shear flow revealed via scanning X-ray microscopy...55**
Graham Cross, Trinity College Dublin, Ireland

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2 **The effect of size, crystal orientation and temperature on the deformation of cast microwires...57**
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3 **Temperature-dependance evalutation on deformation processes in the Alloy 718 using high-resolution digital image correlation...58**
Damien Texier, Institut Clément Ader - UMR CNRS 5312, France

4 **Nanoindentation strain rate jump test-based prediction of fracture and the brittle to ductile transition in tungsten...59**
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Thomas Chudoba, ASMEC GmbH, Germany

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9 **Fast fabrication of micropillar arrays using a combination of laser and FIB for micromechanical compression tests...64**
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