

Program of 10th Meeting of ESIS-TC2 on Micromechanisms in Leoben, Austria

Monday, April 13, 2015

Location: Hörsaal Miller von Hauenfels, Montanuniversität, Franz Josef Straße 18

8:00 – 9:00		REGISTRATION	
Introduction			
9:00 - 9:05	<u>O. Kolednik</u> , J. Pokluda, J. Marrow		Welcome and Organizational remarks
9:05 - 9:10	W. Eichlseder	Montanuniversität, Leoben, Austria	Welcome
9:10 - 9:20	R. Pippan	Erich Schmid Institute, Leoben, Austria	About Erich Schmid Institute
Session 1	Chair: R. Pippan	Fatigue	
9:20 - 9:40	<u>J. Polák</u> , R. Petráš, J. Man	Institute of Physics of Materials AS CR, Brno, Czech Republic	Mechanisms of early fatigue damage in polycrystalline metallic materials
9:40 - 10:00	<u>F. Schäfer</u> , M. Marx, C. Motz	Saarland University, Dep. Materials Sciences and Engineering, Saarbrücken, Germany	Grain boundary resistance against slip transfer – a new model based on the combination of geometric and stress approach
10:00 - 10:20	A.A. Shanyavskiy	State Center for Civil Aviation Flight Safety, Chimkinskiy State, Moscow region, Russia	Fatigue cracking mechanisms of Ti-6Al-4Mo forged titanium alloy in Low-Cycle-fatigue regime
10:20 – 10:40	<u>S. Rabbolini</u> ¹ , P. Luccarelli ¹ , S. Foletti ¹ , H. Sehitoglu ² , S. Beretta ¹	¹ Department of Mechanical Engineering, Politecnico di Milano, Milan, Italy; ² Dept Mechanical Science and Engineering, Univ. of Illinois at Urbana-Champaign, Urbana, IL, USA	Crack growth in Haynes 230: a comparison of strain irreversibility at the crack tip between single and polycrystals
10:40 - 11:00		COFFEE BREAK	
Session 2	Chair: J. Polak	Fatigue	
11:00 - 11:20	<u>T. Vojtek</u> ¹ , J. Pokluda ^{1,2} , A.	¹ Central European Institute of Technology CEITEC, Brno, Czech Republic; ² Faculty of Mech. Engng,	Influence of microstructure on near-threshold shear-mode fatigue crack behavior in ferritic-pearlitic steels

	Hohenwarter ³ , R. Pippan ⁴	Brno Univ. of Technology, Brno, Czech Republic; ³ Dept Materials Physics, Montanuniversität Leoben, Leoben, Austria; ⁴ Erich Schmid Institute of Materials Science, Leoben, Austria	
11:20 - 11:40	<u>W. Daves</u> , M. Kracalik	Materials Center Leoben Forschung GmbH, Leoben, Austria	Mechanisms of crack growth under cyclic contact loads regarding plasticity of the material
11:40 - 12:00	<u>M. Smaga</u> , D. Eifler, T. Beck	Institute of Materials Science and Engineering, Univ. of Kaiserslautern, Kaiserslautern, Germany	Characterization of cyclic deformation behavior and phase transformations in Fe-based metastable austenite using physically based measurement data
12:00 - 12:20	<u>M. Thielen</u> ¹ , M. Sheik-Amiri ² , M. Marx ¹ , C. Boller ² , C. Motz ¹	¹ Saarland University, Chair of Materials Science and Methods, Saarbrücken, Germany ² Saarland University, Chair of Nondestructive Testing and Quality Control, Saarbrücken, Germany	Using Barkhausen noise and digital image correlation to investigate the influence of micro residual stresses on fatigue crack propagation by the example of overloads
12:20 - 14:00		LUNCH	
Session 3	Chair: J. Marrow	Modeling & new materials	
14:00 - 14:20	M. Kureš	Dept Mathematics, Faculty Mech. Engineering, Brno University of Technology, Brno, Czech Republic	Subgroups of jet groups and material symmetries
14:20 - 14:40	V.V. Mokryakov	A.Yu. Ishlinskii Institute for Problems in Mechanics RAS, Moscow, Russia	Modelling of mesostructured medium by finite superelements method
14:40 - 15:00	<u>T. Brynk</u> ¹ , B. Romelczyk ¹ , S. Koenig ¹ , R.M. Molak ¹ , Z. Pakiela ¹ , T. Kurzynowski ² , E. Chlebus ²	¹ Warsaw University of Technology, Faculty of Materials Science and Engineering, Warsaw, Poland ² Wroclaw University of Technology, Faculty of Mechanical Engineering, Wroclaw, Poland	Mechanical properties investigation of materials produced by means of selective laser melting
15:00 - 15:20	<u>A. Hohenwarter</u> ¹ , R. Pippan ²	¹ Dept Materials Physics, Montanuniversität Leoben, 8700 Leoben, Austria; ² Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Leoben, Austria	Fracture and fracture toughness of nanopolycrystalline metals produced by severe plastic deformation
15:20 - 15:40	<u>M. Sistaninia</u> ^{1,2} , R. Kasberger ^{1,3} , O. Kolednik ¹	¹ Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Leoben, Austria; ² Materials Center Leoben Forschung GmbH,	High fracture resistant layered composites using spatial material property variations

		Leoben, Austria; 3 Chair of Metal Forming, Montanuniversität Leoben, Leoben, Austria	
15:40 - 16:00	<u>N. Mehmood</u> ² , E. Andreasson ^{1,2} , Sharon-Kao Walter ^{2,3}	¹ Tetra Pak Packaging Solutions, Lund, Sweden; ² Dept Mech. Eng., Blekinge Institute of Technology, Karlskrona, Sweden; ³ Faculty of Mech. & El. Eng., Shanghai Second Polytechnic Univ., Shanghai, China	A study of ductility, localized necking and microcrack propagation in a thin metal film on polymer substrate
16:00 - 16:20		COFFEE BREAK	
Session 4	Chair: S. Veprek	Nano-sized materials & atomistic modeling	
16:20 - 16:40	<u>S. Kotrechko</u> ¹ , A. Timoshevskij ¹ , N. Stetsenko ¹ I. Mikhailovskij ² , T. Mazilova ²	¹ G.V. Kurdyumov Inst. for Metal Physics, National Academy of Sciences of Ukraine, Kiev, Ukraine; ² National Scientific Center, Kharkov Inst. for Physics and Technology, Nat. Acad. of Sciences of Ukraine, Kharkov, Ukraine,	Key atomistic mechanisms governing the strength of nanosized crystals
16:40 - 17:00	<u>M. Friák</u> ^{1,2} , D. Tytko ¹ , D. Holec ³ , P.-P. Choi ¹ , P. Eisenlohr ¹ , D. Raabe ¹ , J. Neugebauer ¹	¹ Max-Planck-Inst. für Eisenforschung, Düsseldorf, Germany; ² Inst. Physics of Materials, Acad. of Sciences of Czech Republic, Brno, Czech Republic; ³ Montanuniversität Leoben, Leoben, Austria	Theory-guided materials design of high-performance superlattices containing metastable phases: example of nano-scale CrN/AlN
17:00 - 17:20	<u>P. Lejčák</u> ¹ <u>M. Šob</u> ^{2,3,4}	¹ Lab. Nanostructures and Nanomaterials, Inst. of Physics, Acad. of Sciences of Czech Republic, Praha; ² Central European Institute of Technology CEITEC MU, Brno; ³ Inst. Physics of Materials, Acad. of Sciences of Czech Republic, Brno; ⁴ Dept Chemistry, Faculty of Science, Masaryk University, Brno	Grain boundary segregation and embrittlement: recent advances and open problems
17:20 - 17:40	<u>M. Všíanská</u> ^{1,2} , <u>M. Šob</u> ^{1,2,3}	¹ CEITEC MU, Masaryk University, Brno, Czech Republic; ² Inst. Physics of Materials, Acad. of Sciences of Czech Republic, Brno; ³ Dept of Chemistry, Masaryk University, Brno	Ab initio study of segregated grain boundaries in ferromagnetic metals
17:40 - 18:00	<u>S. Melin</u> , P. Hansson	Division of Mechanics, Lund University, Lund, Sweden	Nanoidentation – a molecular dynamics study
19:00		CONFERENCE DINNER: ARKADENHOF, HAUPTPLATZ 11	

Tuesday, April 14, 2015

Location: Hörsaal Miller von Hauenfels, Montanuniversität, Franz Josef Straße 18

Keynote Lecture Chair: J. Pokluda			
8:30 – 9:00	S. Veprek	Department of Chemistry, Technical University Munich, Germany	Mechanism of Hardness Enhancement and of Plastic Deformation in Super- and Ultrahard nc-TiN/Si3N4 and Related Nanocomposites
Session 5 Chair: J. Pokluda Ceramic materials			
9:00 - 9:20	<u>M. Kotoul</u> , P. Skalka	Brno University of Technology, Brno, Czech Republic	Application of the strain gradient elasticity to ceramic laminates with cellular interlayers
9:20 - 9:40	<u>D. Leguillon</u> ¹ , <u>O. Sevecek</u> ² , E. Martin ³ , R. Bermejo ⁴	¹ Inst. Jean Le Rond d'Alembert, Sorbonne Univ., Paris, France; ² Inst. Solid Mechanics, Mechatronics & Biomechanics, Faculty Mech. Engineering, Brno Univ. of Technology, Brno, Czech Republic; ³ Laboratoire des Composites Thermo-Structuraux, Univ. de Bordeaux, Pessac, France; ⁴ Inst. Struktur- u. Funktionskeramik, Montanuniversität Leoben	Application of a coupled stress-energy criterion to model the crack propagation in ceramic laminates designed with residual stresses
9:40 - 10:00	<u>R. Bermejo</u> ¹ , C. Krautgasser ^{1,2} , P. Supancic ¹ , R. Danzer ¹	¹ Institut für Struktur- und Funktionskeramik, Montanuniversität Leoben, Austria; ² Materials Center Leoben Forschung GmbH, Leoben, Austria	Environmental strength degradation in Low Temperature Co-fired Ceramics: experiments and modelling
10:00 - 10:20	P. Skalka, <u>K. Slámečka</u> , J. Pokluda, L. Čelko	Faculty of Mechanical Engineering, Brno University of Technology, and Central European Institute of Technology, Brno University of Technology, Brno, Czech Republic	On the influence of the roughness of the bond coat and the thickness of the thermally grown oxide layer on stresses in plasma-sprayed thermal barrier coatings
10:20 - 10:40		COFFEE BREAK	
Session 6 Chair: M. Kotoul Ceramic materials			
10:40 - 11:00	D. Zaytsev, <u>P. Panfilov</u>	Ural Federal University, Institute of Natural Sciences, Ekaterinburg, Russia	On the deformation mechanisms in human dentin and enamel
11:00 - 11:20	<u>M. Davydova</u> , S. Uvarov, O. Naimark, I. Bannikova	Institute of Continuous Media Mechanics UB RAS, Perm, Russia	Scaling laws of brittle fragmentation statistics

11:20 - 11:40	J. Elias	Brno University of Technology, Faculty of Civil Engineering, Institute of Structural Mechanics, Brno, Czech Republic	Discrete approach to modeling of fracture in stochastic heterogeneous media
11:40 - 12:00	V. Veselý, J. Klon, P. Frantík	Brno University of Technology, Faculty of Civil Engineering, Institute of Structural Mechanics, Brno, Czech Republic	Work of fracture of quasi-brittle structure associated with the crack and the fracture process zone advancements
12:00 - 12:20	L. Saucedo-Mora ¹ , Y. Vertyagina ¹ , T.J. Marrow ^{1,2}	University of Oxford, ¹ Department of Materials, ² Oxford Martin School, Oxford, United Kingdom	Multi-scale fracture modelling of polygranular nuclear graphite using properties measured at the microscale
12:20 - 14:00		LUNCH	
Session 7	Chair: S. Melin	Metal fracture	
14:00 - 14:20	A.P. Jivkov ¹ , A. Abu-Muharib ¹ , I. Dassios ¹ , P.M. James ²	¹ Dalton Nuclear Institute, University of Manchester, Manchester, UK; ² Amec Foster Wheeler, Walton House, Warrington, UK	Micro-cracking, damage evolution and probability of cleavage failure in ferritic RPV steels
14:20 - 14:40	A. Umgeher ^{1,2} , H. Kreuzer ³ , O. Kolednik ¹	¹ Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Leoben, Austria; ² Materials Center Leoben, Leoben, Austria; ³ voestalpine Stahl GmbH, Linz, Austria	Conditions for the occurrence of cleavage fracture in Fe–Si–Al alloys
14:40 - 15:00	P. Panfilov	Ural Federal University, Yekaterinburg, Russia	The forming of fracture surface in plastic metal, which cleaves
15:00 - 15:20	B. Strnadel	Center of Advanced Innovation Technologies - VŠB-Technical University of Ostrava, Ostrava-Poruba, Czech Republic	Geometrical characteristics of ductile fracture surfaces in steels
15:20 - 15:40		COFFEE BREAK	
Session 8	Chair: A. Shanyavskiy	Welds & dynamic fracture	
15:40 - 16:00	M. Rakin ¹ , B. Younise ² , B. Medjo ¹ , N. Gubeljak ³ , A. Sedmak ²	¹ University of Belgrade, Faculty of Technology and Metallurgy, Serbia; ² Univ. of Belgrade, Faculty of Mechanical Engineering, Serbia; ³ Univ. of Maribor, Faculty of Mechanical Engineering, Slovenia	Fracture of high-strength low-alloyed steel welded joints with different crack shapes

16:00 - 16:20	<u>N. Gubeljak</u> , J. Predan	University of Maribor, Faculty of Mechanical Engineering, Maribor, Slovenia	Structure integrity assessment of inhomogeneous weld joint by using concept of configurational forces
16:20 - 16:40	O. Naimark	Institute of Continuous Media Mechanics RAS, Perm, Russia	Criticality of damage-failure transition: spatial-temporal analysis of defect induced scaling and fragmentation statistics in quasi-brittle materials
16:40 - 17:00	A. Sorochak ¹ , P. Maruschak ¹ , A. Menou ² , <u>T. Vuherer</u> ³ , S. Panin ⁴	¹ Ternopil National Ivan Pul'uj Technical University, Ternopil, Ukraine; ² National Airports Authority of Morocco (ONDA), Academie Mohammed V de l'Aviation Civile, Morocco; ³ Univ. of Maribor, Maribor, Slovenia; ⁴ Institute of Strength Physics and Materials Science SB RAS, Tomsk, Russia	Impact toughness and fracture mechanisms of steel of locomotive axle
17:00 – 17:20	V. Hutsaylyuk	Faculty of Mechanical Engineering, Military University of Technology, Warsaw, Poland	Micromechanisms fracture of the aluminium alloys in the conditions preliminary combined loading
17:20		END OF CONFERENCE	