Table of Contents

Invited plenary lectures

Zhiliang **Zhang**
Structures-mechanical Property Relations of Gas Hydrates as a Material 19

Alexander **Hartmaier**
Atomistically Informed Continuum Models for Plasticity and Fracture 20

Takayuki **Kitamura**, Takashi **Sumigawa**, Takahiro **Shimada**
Fracture Mechanics in Atomic Scale 21

Section 1: ISAM^4 Atomistic Modeling for Mechanics and Multiphysics of Materials

Václav **Vitek**, Yi-Shen **Lin**, Matouš **Mrovec**
Development of Bond-order Potentials for bcc Transition Metals – KEYNOTE 22

Shigenobu **Ogata**
Atomistic Modeling of Diffusive and Displacive Deformation Processes in Plasticity – INVITED 23

Hajime **Kimizuka**, Shigenobu **Ogata**
First-principles Characterization of the Diffusion of Hydrogen in the Bulk of Metals – KEYNOTE 24

Kisaragi **Yashiro**
Local Lattice Instability at Mode I Crack Tip: Emergence of High Stiffness Zone in Si – INVITED 25

Yoji **Shibutani**, Daisuke **Matsunaka**
Defects Mechanics; Three-body Problem of Defects Interaction among Crack, Dislocations and Twin Boundary in Magnesium – KEYNOTE 26

Hideki **Mori**
Temperature and Stress Dependence of Mobility of Screw Dislocation in bcc Iron 27

Dmitrij **Kryzhevich**, Aleksandr **Korchuganov**, Konstantin **Zolnikov**, Sergey **Psakhie**
Role of Localized Non-equilibrium States in Nucleation of Plastic Deformation in Nanocrystalline Materials 28

Aylin **Ahadi**, Per **Hansson**, Solveig **Melin**
Simulating Nano Indentation of Thin Copper Film Using Molecular Dynamics and Peridynamics 29

Andriy **Ostapovets**, Olena **Vatazhuk**
Non-Schmid Phenomena in hcp Materials 30

Guang-Hong **Lu**, Yi **Yu**, Xiaolin **Shu**, Liangliang **Niu**, Yi-Nan **Liu**, Fei **Gao**
Effect of Hydrogen and Helium on Grain Boundary Migration in Tungsten 31

Monika **Všianská**, Mojmír **Šob**
Ab initio Study of Segregated Grain Boundaries in Nickel-based Ferromagnetic Alloys with L12 Structure: Ni3Fe 32

Martin **Friák**, Monika **Všianská**, David **Holec**, Mojmír **Šob**
Tensorial Elastic Properties and Mechanical Stability of Σ5(210) Grain-boundary Complexions in Ni3Al from ab initio Calculations 33

Tomoyuki **Tamura**, Ryuuichi **Arakawa**, Masayuki **Karasuyama**, Ryo **Kobayashi**, Shuji **Ogata**
Statistical Prediction of Grain-boundary Properties 34

Mojmír **Šob**, Martin **Friák**
From Uniaxial to Triaxial Deformation: An ab initio Study of Molybdenum Disilicide 35
Lei **Zhang**, Sheng-Li **Jiang**, Jun **Chen**
Phase Transition of Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) under Static Compression: An Application of First-principles Method Specialized for Molecular Crystals 36
Martin **Zelený**, Ivo **Dlouhý**
Different ab initio Approaches for Doping Descriptions: Tetragonal Deformation of Ni-Mn-Ga Alloys 37
Tomohito **Tsuru**, Liang **Qi**, Daryl **Chrzan**, Masatake **Yamaguchi**, Mitsuhiro **Itakura**
Solute-induced Changes in Dislocation Motion in Mg and Ti 38
Daisuke **Matsunaka**, Yoji **Shibutani**
Theoretical Study of Inter-planer Ordering of Mg-based LPSO Structures 39
James **Kermode**
Multiscale Modelling of Materials Chemomechanics: From Stress Corrosion Cracking to Catastrophic Brittle Fracture 40
Vladimír **Pelikán**, Petr **Hora**, Anna **Machová**, Radek **Kolman**, Alena **Uhnáková**
Sample Geometry and the Brittle-ductile Behavior of Edge Cracks in 3D Atomistic Simulations by Molecular Dynamics 41
Polina **Baranova**, Johannes **Möller**, Erik **Bitzek**
Fracture Behavior of B2 NiAl Single Crystals: Influence of Heterogeneities 42
Bradley **Huddleston**, Doyl **Dickel**, Mark **Horstemeyer**, Neil **Williams**, Kent **Danielson**, Youssef **Hammi**
Damage Progression and Fragmentation in Atomistic, Single Crystal Copper at High Strain Rates 43
Solveig **Melin**, Aylin **Ahadi**, Per **Hansson**
Tensile Behaviour of Single-crystal Nano-sized Copper Beams with Voids 44
Konstantin **Zolnikov**, Dmitrij **Kryzhevich**, Aleksandr **Korchuganov**, Sergey **Psakhie**
Dynamics of Bicomponent Nanoparticle Formation under Metal Wire Explosion 45
Yoshitaka **Umeno**, Masanobu **Sato**, Hiroyuki **Shima**, Motohiro **Sato**
Atomistic Modeling Analysis of Buckling of Pressurized Nanotubes 46
Motohiro **Sato**, Yu **Yachi**, Ikuyo **Koike**, Hiroyuki **Shima**, Yoshitaka **Umeno**
Cross-sectional Deformation in Multi-walled Carbon Nanotubes under Hydrostatic Pressure 47
Albert **Iskandarov**, Tomofumi **Tada**, Yoshitaka **Umeno**
Molecular Dynamics Simulation of Anode in Solid Oxide Fuel Cells 48
Ryo **Kobayashi**, Tomoyuki **Tamura**, Ichiro **Takeuchi**, Shuji **Ogata**
Development of Neural-network Interatomic Potentials for Structural Materials 49
Senbo **Xiao**, Jianying **He**, Zhiliang **Zhang**
Probing Nanoscale Ice Detaching Mechanics Using Molecular Dynamics Simulations 50
Atsushi **Kubo**, Yoshitaka **Umeno**
Coarse-grained Molecular Dynamics Simulation of Fracture Problems in Polycarbonate 51
Koichi **Nakamura**
First-principles Simulation on Thermoelectric Properties in Low-dimensional Materials 52
Takahiro **Shimada**, Yasumitsu **Araki**, Tao **Xu**, Jie **Wang**, Takayuki **Kitamura**
Monatomic Multiferroics: Lattice Defects in Nonmagnetic Ferroelectrics 53

Tomáš **Káňa**, Aleš **Kroupa**, Jiří **Buršík**, Adéla **Zemanová**, Mojmír **Šob**
Surface Stress and Phase Diagrams of Nanoalloys - Application to Lead-free Solders 54
Yoshinori **Shiihara**, Masanori **Kohyama**
Local Stress Analysis of Adsorption-induced Surface Stress on Late-transition Metallic Surface 55
Ivan **Lobzenko**, Georgyi **Chechin**, Sergey **Dmitriev**
Ab initio Modelling of Discrete Quasibreathers in Graphene and Graphane 56

Section 2: Deformation and fracture models based on crystal defects behaviour

Antonín **Dlouhý**, Tomáš **Záležák**, Jiří **Svoboda**
Understanding Creep in Engineering Materials through 2D and 3D Discrete Dislocation Models – INVITED 57
Roman **Gröger**, Turab **Lookman**
Mesoscopic Description of Dislocation Patterning Using the Concept of Incompatibility of Strains – INVITED 58
Václav **Paidar**
Dislocations in B2 Alloys 59
Florian **Schäfer**, Michael **Marx**, Christian **Motz**
How to Measure a Dislocation's Breakthrough Stress to Estimate the Grain Boundary Resistance against Slip Transfer Based on the DFZ-model of Fracture 60
Jan **Fikar**, Roman **Gröger**
Shape of Small Prismatic Dislocation Loops in Tungsten and Iron 61
Hideo **Koguchi**, Yusuke **Tanaka**
Interaction of Misfit Dislocations at Interfaces in Multilayered Materials 62
Tomáš **Záležák**, Filip **Šiška**, Luděk **Stratil**, Natália **Luptáková**, Miroslav **Šmíd**, Denisa **Bártková**, Jiří **Svoboda**, Antonín **Dlouhý**
A Numerical Analysis of Deformation Processes in Oxide Dispersion Strengthened Materials - Influence of Dislocation-particle Interactions 63
Svetlana **Kulkova**, Alexander **Bakulin**, Sergey **Kulkov**
Influence of Impurities on Grain Boundaries Cohesion in B2-TiMe 64

Section 3: Mathematical modeling microstructure, deformation and fracture

Alexander **Landa**, Per **Söderlind**
Alloying-driven Phase Stability in Group-VB Transition Metals under Compression – INVITED 65
Petr **Haušild**, Aleš **Materna**, Lenka **Kocmanová**, Jiří **Matějíček**
Some Issues in Relations between Microstructure and Indentation Measurements – INVITED 66
Ilia **Nikitin**, Nikolay **Burago**, Alexander **Nikitin**
Continuum Model of the Layered Medium with Slippage and Nonlinear Conditions at the Interlayer Boundaries 67
Kirill **Khvostunkov**, Dmitrii **Telitsyn**, Alexey **Shpenev**
Damage Function and Durability of High Temperature Fiber Composites. 68
Miroslav **Frost**, Petr **Sedlák**, Pavel **Sedmák**, Luděk **Heller**, Petr **Šittner**
Numerical Study on Localization of Phase Transformation in NiTi Shape Memory Wires 69

Ilia **Nikitin**, Nikolay **Burago**, Alexander **Nikitin**
The Life Duration for Compressor Disc under Torsional Vibrations of the Blades 70
Andrzej **Neimitz**, Urszula **Janus**
The Cellular Automata Theory in Fracture Mechanisms Predictions 71
Miroslav **Kureš**
Higher Order Frames and Material Symmetries 72
Jiří **Vala**
Existence and Convergence Questions in Computational Modelling of Crack Growth in Brittle and Quasi-brittle Materials 73
Arkadi **Berezovski**
Microstructure Influence Modeling by Means of Internal Variables 74
Oldřich **Ševeček**, Petr **Navrátil**, Roman **Papšík**, Petr **Skalka**, Michal **Kotoul**
Influence of the Ceramic Foam Structure Irregularity on the Tensile Response 75
Boris **Tarasov**, Mikhail **Guzev**, Vladimir **Sadovskiy**, Alexander **Losev**
Fan-hinged Shear as a Unique Mechanism of Dynamic Shear Ruptures 76
Ondrej **Krepl**, Jan **Klusák**
Multi-parameter Based Stress Distribution in Vicinity of Sharp Material Inclusion Tip 77
Jan **Poduška**, Pavel **Hutař**, Jaroslav **Kučera**, Jiří **Sadílek**, Andreas **Frank**, Gerald **Pinter**, Luboš **Náhlík**
The Effect of Residual Stress on the Process of Crack Growth Rate Determination in Polymer Pipes 78
Zdeněk **Majer**, Luboš **Náhlík**, Kateřina **Štegnerová**, Pavel **Hutař**, Raul **Bermejo**
Study of Influence of Residual Stresses on Crack Propagation in Particulate Ceramic Composites 79
Jalil **Vafa**, Shahriar **Fariborz**
Analysis of Micro-cracks Using Modified Couple-stress Elasticity under Anti-plane Deformation 80
Vladislav **Kozák**, Zdeněk **Chlup**, Petr **Padělek**, Ivo **Dlouhý**
Prediction of the Traction Separation Law of Ceramics Using Iterative Finite Element Modelling 81
Kateřina **Štegnerová**, Luboš **Náhlík**, Raul **Bermejo**, Pavel **Hutař**
Influence of Particle Attribues on Residual Stresses in Particulate Ceramic Composites 82

Section 4: Multiaxial deformation and fracture, experiment and modeling

Véronique **Doquet**, Neji **Ben Ali**, Martine **Dubé**, Andrei **Constantinescu**
Multiple Cracking in Nuclear Glass Due to Thermally-induced Biaxial and Triaxial Tension – INVITED 83
Larisa **Stepanova**, Pavel **Roslyakov**, Tattjana **Gerasimova**
Complete Williams Asymptotic Expansion Near the Crack Tips of Collinear Cracks of Equal Lengths in an Infinite Plane 84
František **Šebek**, Jindřich **Petruška**, Petr **Kubík**
Behavior of Lode Dependent Plasticity at Plane Strain Condition and its Implication to Ductile Fracture 85
Camilla **Ronchei**, Andrea **Carpinteri**, Giovanni **Fortese**, Daniela **Scorza**, Sabrina **Vantadori**
Fretting High-cycle Fatigue Assessment through a Multiaxial Critical Plane-based Criterion in Conjunction with the Taylor's Point Method 86

Michal **Hlobil**, Maximilian **Göstl**, Jacques **Burrus**, Christian **Hellmich**, Bernhard **Pichler**
Tensile Failure of Mortar and Concrete: A Microfracturemechanics-inspired Damage Model Including Size-effect 87
Werner **Daves**, Michal **Kracalik**
Cracks and Mechanics of Rolling Contact - A Summary of Influences 88
Zihui **Xia**, Jie **Chen**
Low Cycle Fatigue Tests on Structural Specimens of Coke Drum and Finite Element Modeling 89
Georgios **Maliaris**, Elias **Sarafis**
Mechanical Behavior of 3D Printed Stochastic Lattice Structures 90
Martin **Lederer**, Golta **Khatibi**, Julien **Magnien**
On the Influence of Internal Void Size on the Fracture Stress of Constrained Solder Joints 91
Shun-Fa **Hwang**, Hsuan-Ting **Liu**
Prediction of Elastic Constants of Carbon Fabric/polyurethane Composites 92

Section 5: Nanomaterials: technology, properties and modeling

Anton **Hohenwarter**, Reinhard **Pippan**
Fracture of Severely Plastically Deformed Metals – INVITED 93
Andreas **Herz**, Martin **Friák**, Diana **Rossberg**, Martina **Hentschel**, Felix **Theska**, Dong **Wang**, David **Holec**, Mojmír **Šob**, Oldřich **Schneeweiss**, Peter **Schaaf**
Combined Experimental and Theoretical Study of Facet-controlled Phase Separation in Supersaturated Au-Ni Nanoparticles upon Shape Equilibration 94
Thomas **Leitner**, Anton **Hohenwarter**, Reinhard **Pippan**
The Influence of Grain Size on the Fatigue Crack Growth of Ultrafine-grained Iron 95
Jiří **Man**, Ivo **Kuběna**, Anja **Weidner**, Ondřej **Man**, Antti **Järvenpää**, L. Pentti **Karjalainen**, Jaroslav **Polák**
Effect of Chemical Heterogeneity on Microstructural Changes during Processing of UFG Austenitic 301LN Steel 96
Jianying **He**
Deformation and Fracture of Composite Polymer Particles 97
Inga **Müller**, Rosalia **Rementeria**, Francisca G. **Caballero**, Matthias **Kuntz**, Eberhard **Kerscher**
Correlation of Fatigue Limit and Crack Growth Threshold Value to the Nanobainitic Microstructure 98
Vilma **Buršíková**, Jaroslav **Sobota**, Jan **Grossman**, Tomáš **Fořt**, Lukáš **Zábranský**, Pavel **Souček**, Petr **Vašina**, Jiří **Buršík**
Study of Fracture Resistance of Nanolaminate Coatings Using Indentation and Impact Tests 99
Roman **Gruzdev**, Arkady **Soloviev**
Polarizable Models in Molecular Dynamics 100

Section 6: Biomaterials: deformation, fracture, modeling

Martin **Friák**, Gernot **Pfanner**, Jan **Fikar**, Michal **Petrov**, Svetoslav **Nikolov**, David **Holec**, Helge-Otto **Fabritius**, Dierk **Raabe**, Mojmír **Šob**, Andreas **Ziegler**, Jörg **Neugebauer**
Multi-descriptive Scale-bridging Modeling of Hierarchical Bio-composites – INVITED 101

Radim **Chmelík**
Coherence-controlled Holographic Microscopy: Case Studies in Materials and Life Sciences – INVITED 102
Michal **Kotoul**, Petr **Skalka**
Computational Analysis of Crack Bridging in Bioglass®-based Porous Scaffolds by Using Polymer Coatings 103
Zbyněk **Tonar**, Petra **Kochová**, Robert **Cimrman**, Josef **Perktold**, Tereza **Kubíková**, Erna **Demjen**, Václav **Liška**, Milena **Králíčková**, Kirsti **Witter**
Links between the Orientation of Vascular Smooth Muscle and Microscopical Composition of Aortic Segments 104
Miroslava **Horynová**, Mariano **Casas Luna**, Edgar B. **Montufar**, Sebastián **Díaz de la Torre**, Ladislav **Čelko**, Lenka **Klakurková**, Guillermo **Diéguez-Trejo**, Karel **Dvořák**, Tomáš **Zikmund**, Jozef **Kaiser**
Fracture Mechanism of Interpenetrating Iron-tricalcium Phosphate Composite 105
Mitra **Delshadmanesh**, Golta **Khatibi**, Martin **Lederer**, Michael **Zehetbauer**, Herbert **Danninger**
Influence of Defects on High Cycle Fatigue Response of Ti45Nb Biocompatible Alloy 106
Tereza **Kubíková**, Petra **Kochová**, Radovan **Fiala**, Jaroslav **Špatenka**, Jan **Burkert**, Milena **Králíčková**, Zbyněk **Tonar**
Histological Composition and Mechanical Properties of Cryopreserved Samples of Aortic and Pulmonary Valve 107

Section 7: Surface and interface microstructure and properties

David **Holec**, Helmut **Riedl**, Jörg **Paulitsch**, Paul H. **Mayrhofer**
Surface Adsorption Phenomena from First Principles: An Application to Protective Coatings – INVITED 108
Konstantinos **Anthymidis**, Afroditi **Trakali**, Dimitrios **Tsipas**
Single and Multielement Coatings in a Fluidized Bed Reactor 109
Ladislav **Čelko**, David **Jech**, Karel **Dvořák**, Ivo **Šulák**, Lenka **Klakurková**, Karel **Obrtlík**
Durability of Amorphous and Crystalline BMAS Thermal Barrier Coatings Produced by Plasma Spraying 110
David **Jech**, Ladislav **Čelko**, Lenka **Klakurková**, Karel **Slámečka**, Miroslava **Horynová**, Jiří **Švejcar**
Formation of Thermally Sprayed Coatings on Grid-like Structure Substrate 111
Pavel **Lejček**, Pavel **Šandera**, Jana **Horníková**, Jaroslav **Pokluda**
Segregation and Intergranular Fracture of Ferritic Iron Doped by Silicon, Tin, Phosphorus and Antimony 112
Serhii **Tkachenko**, Oleg **Datskevich**, Zdeněk **Spotz**, Karel **Dvořák**, Leonid **Kulak**, Ladislav **Čelko**
Oxidation of Experimental Ti-Si-Al Based Alloys 113
Ondrej **Pilch**, Vojtěch **Hrubý**
Influence of Diffusivity of Materials on Nitrided Layers Thickness 114
Michaela **Remešová**, Lenka **Klakurková**, Ladislav **Čelko**, Lucia **Sládková**, David **Jech**, Jozef **Kaiser**
Anodizing of Zinc-titanium Alloy in NaOH and KOH Baths 115

Section 8: Advanced experimental and theoretical methods for microstructure investigation

Matthew R **Barnett**
Characterization of Single Twinning Events during Nanoindentation of Magnesium – INVITED 116

Kristián **Máthis**, Jan **Čapek**, Bjørn **Clausen**, Tobias **Panzner**
Influence of the Loading Path on the Deformation Mechanisms of Magnesium Alloys – INVITED 117

Petr **Brož**
Welded Zone Integrity 118

Sebastián **Díaz de la Torre**, Ladislav **Čelko**, Mariano **Casas Luna**, Edgar B. **Montufar**
On the Preparation of Advanced Materials via Pulsed Electric Current Sintering Procedures 119

Ivona **Černičková**, Marek **Adamech**, Libor **Ďuriška**, Marián **Drienovský**, Dušan **Janičkovič**, Pavol **Priputen**, Jozef **Janovec**
Microstructure Similarities between Phases F and U in Al-Pd-Co Alloys 120

Gulzar **Seidametova**, Jean-Bernard **Vogt**, Ingrid **Proriol Serre**
AFM Study of Microstructure Role in the Cyclic Plasticity of Martensitic Steel 121

Aneta **Zatočilová**, Tomáš **Zikmund**, Jozef **Kaiser**, David **Paloušek**, Daniel **Koutný**
Measurement of the Porosity of Additive-manufactured Al-Cu Alloy Using X-ray Computed Tomography 122

Victor **Mykhas'kiv**, Bohdan **Stasyuk**
Elastic Moduli of 3D Composites with Short Curvilinear Fibers 123

Marek **Smaga**, Lena **Scherthan**, Hendrik **Auerbach**, Juliusz A. **Wolny**, Volker **Schünemann**, Tilmann **Beck**
Magneto-mechanical Behavior of Iron during Monotonic and Cyclic Loading 124

Section 9: Experimental studies on the relation between microstructure and mechanical properties

Angelika **Brueckner-Foit**, Pascal **Pitz**, Phillip **Grahlmann**, Frank **Zeismann**
Experimental Determination of Crack Driving Forces for Small Cracks – INVITED 125

Alice **Chlupová**, Milan **Heczko**, Karel **Obrtlík**, Přemysl **Beran**, Tomáš **Kruml**
Effect of Alloying and Thermal Processing on Mechanical Properties of TiAl Alloys – INVITED 126

Guocai **Chai**
Micro Mechanical Behaviors and Damage in Nickel Base Alloy and Steels during Fatigue – INVITED 127

Haruyuki **Inui**, Kyosuke **Kishida**
Crystal Structure and Deformation of Long-period Stacking-ordered Intermetallic Phases in the Mg-TM-RE Ternary Systems – INVITED 128

Setsuo **Takaki**, Yuki **Tanaka**, Daichi **Akama**, Toshihiro **Tsuchiyama**
Effect of Grain Size on the Dislocation Introduction in Iron – INVITED 129

Jelena **Djoković**, Ružica **Nikolić**, Jan **Bujňák**, Branislav **Hadzima**
Criteria for Prediction the Interfacial Crack Growth in Concrete 130

Stanislav **Seitl**, José **Ríos**, Héctor **Cifuentes**, Václav **Veselý**
Effect of the Load Eccentricity on Fracture Behaviour of Cementitious Materials Subjected to the Modified Compact Tension Test 131

Anand **Harihara Subramonia Iyer**, Magnus **Colliander**, Krystyna **Stiller**
Crack Growth Studies in a Welded Ni-base Superalloy 132
Radomila **Konečná**, Gianni **Nicoletto**, Adrian **Bača**, Ludvík **Kunz**
High Cycle Fatigue Life of Ti6Al4V Alloy Produced by Direct Metal Laser Sintering 133
Veronika **Mazánová**, Milan **Heczko**, Ivo **Kuběna**, Jaroslav **Polák**
Surface Relief Formation in Relation to the Underlying Dislocation Arrangement 134
Martin **Klein**, Frank **Walther**
Microstructure-based Assessment of the Corrosion Fatigue Behavior of Creep-resistant Magnesium Alloys DieMag422 and AE42 135
Milan **Heczko**, Philippe **Spätig**, Hans-Peter **Seifert**, Tomáš **Kruml**
Correlation between Dislocation Structures and Mechanical Fatigue Response of 316L Austenitic Steel Loaded with and without Mean Stress at High Temperature in Air and Water Environment 136
Satoshi **Araki**, Daichi **Akama**, Toshihiro **Tsuchiyama**, Setsuo **Takaki**
Mechanism on the Appearance of Spike-yielding in Ultra-low Carbon Steel 137
Ralf **Lach**, Tobias **Krolopp**, Pavel **Hutař**, Eva **Nezbedová**, Wolfgang **Grellmann**
Short-term Stable Crack Propagation through Polyolefin Single- and Bilayered Structures – Influence of Welding, Composition and Direction of Crack Propagation 138
David **Dobrocký**, Pavel **Maňas**, Zdeněk **Pokorný**, Zbyněk **Studený**
The Influence of Tempering during Plasma Nitriding Process on Mechanical Properties of 14NiCr14 Steel 139
Maxime **Delbove**, Jean-Bernard **Vogt**, Jérémie **Bouquerel**, Thierry **Soreau**, Nicolas **Francois**, Francois **Primaux**
Microstructure Evolution of a Precipitation Hardened Cu-Ni-Si Alloy during Low-cycle Fatigue 140
Héloïse **Vigié**, Aurélie **Soula**, Bernard **Viguier**
Aging of the β21S Titanium Alloy 141
Maciej **Gruszczyński**, Małgorzata **Lenart**
The Development of Strength and Microstructure of the Resin Mortar 142
Małgorzata **Lenart**, Maciej **Gruszczyński**
Analysis of Resin Mortar Shrinkage and Adhesion 143
Pavlos **Agrianidis**, Konstantinos **Anthymidis**, Georgios **Stergioudis**, Dimitrios **Tsipas**
Reinforcement of Aluminum Matrix by Iron – Silicon – Chromium Dissolution and TiB and TiB2 Particles 144
Ivo **Černý**, Dagmar **Mikulová**
Static Tensile Strength and E-modulus Evaluation of a High-strength Reinforcing Textile Fabrics 145
Lucyna **Domagała**
The Influence of Concrete Type and Strength on the Relationship between Initial and Stabilised Secant Moduli of Elasticity 146
Daichi **Akama**, Toshihiro **Tsuchiyama**, Setsuo **Takaki**
Solid Solution Strengthening by Ni in Ultra-low Carbon Martensitic Steel 147
Héloïse **Vigié**, T. **De Paula**, Martin **Surand**, Bernard **Viguier**
Low Temperature Strain Rate Sensitivity of Titanium Alloys 148
Filip **Šiška**, Luděk **Stratil**, Miroslav **Šmíd**, Natália **Luptáková**, Tomáš **Záležák**, Denisa **Bártková**, Jiří **Svoboda**
Mechanical Behaviour of the New Generation of Fe-Al-O Oxide Dispersion Strengthened Alloy 149

Farnoosh **Forouzan**, Suresh **Gunasekaran**, Ali **Hedayati**, Esa **Vuorinen**, Frank **Mücklich**
Microstructure Analysis and Mechanical Properties of Low Alloy High Strength Quenched and Partitioned Steel 150

Pavlína **Trubačová**, Miroslav **Píška**, Jana **Horníková**, Pavel **Šandera**, Karel **Slámečka**
Analysis of Selective Laser Melting Process Parameters Effect on Mechanical and Material Properties for Stainless Steel 316L 151

Zdeněk **Pokorný**, Jaromír **Kadlec**, Zdeněk **Joska**, Zbyněk **Studený**, David **Dobrocký**, Miroslav **Pospíchal**
Layer Properties after Plasma Nitriding Process 152

Aneta **Nowak-Michta**
An Abrasion Damage of Fly Ash Concretes Previously Subjected to Scaling 153

Václav **Sklenička**, Květa **Kuchařová**, Marie **Kvapilová**, Petr **Král**, Jiří **Dvořák**
Combination of Experiments and Continuum Damage Mechanics Approach for Prediction of Creep Fracture in an Advanced 9%Cr Steel 154

Vít **Horník**, Miroslav **Šmíd**, Pavel **Hutař**, Ludvík **Kunz**, Karel **Hrbáček**
Interaction of Creep and High Cycle Fatigue of IN 713LC Superalloy 155

Rostislav **Kawulok**, Ivo **Schindler**, Petr **Kawulok**, Janusz **Dänemark**, Petr **Opěla**, Stanislav **Rusz**
Study of Phase Transformation of Medium Carbon Steel after Hot Plastic Deformation 156

Marie **Kvapilová**, Květa **Kuchařová**, Karel **Hrbáček**, Václav **Sklenička**
Creep Processes in MAR-M247 Nickel-base Superalloy 157

Pavel **Pokorný**, Pavel **Hutař**, Luboš **Náhlík**
Influence of Extension of Load Spectrum on Estimation of Residual Fatigue Lifetime of Railway Axle 158

Petr **Kawulok**, Radek **Jurča**, Ivo **Schindler**, Stanislav **Rusz**, Rostislav **Turoň**, Petr **Opěla**, Rostislav **Kawulok**
Laboratory Controlled Rolling of Microalloyed Steel for Production of Seamless Tubes 159

Section 10: ESIS TC2 Micromechanisms of fracture and fatigue

Stefano **Beretta**, Stefano **Foletti**, Silvio **Rabbolini**, Huseyin **Sehitoglu**
Fatigue Crack Propagation in Haynes 230: A Comparison between Single and Polycrystal Crack Closure Levels – INVITED 160

Andrey **Shanyavskiy**
Scales of Metals Fatigue Failures and Mechanisms for Subsurface Fracture Origin Formation – INVITED 161

Ulrich **Krupp**, Marcus **Söker**, Tina **Waurischk**, Alexander **Giertler**, Benjamin **Dönges**, Hans-Jürgen **Christ**
The Influence of Microstructure Heterogeneities on the Very High Cycle Fatigue Behavior of Duplex Stainless Steel – INVITED 162

Saburo **Matsuoka**, Junichiro **Yamabe**, Hisao **Matsunaga**
Understanding the Mechanism of Hydrogen Embrittlement of Austenitic Stainless Steels – INVITED 163

Tomáš **Vojtek**, Jaroslav **Pokluda**, Anton **Hohenwarter**, Reinhard **Pippan**
Intrinsic Behaviour of Mode II and Mode III Long Fatigue Cracks in Zirconium and the Ti-6Al-4V Alloy. 164

Ryuichiro **Ebara**
Grain Size Effect on Low Cycle Fatigue Behavior of High Strength Structural Materials 165

Alexander **Nikitin**, Andrey **Shanyavskiy**, Thierry **Palin-Luc**
Comparison of 'Fish-eye' Formation in VT3-1 Titanium Alloy under Tensile and Torsion Fully Reversed Loading in Gigacycle Fatigue 166
Roman **Petráš**, Viktor **Škorík**, Jaroslav **Polák**
Crack Initiation in Austenitic Stainless Steel Sanicro 25 Subjected to Thermomechanical Fatigue 167
Mohammed Mahmoud **Aish**, Mikhail D **Starostenkov**
Deformation and Fracture of Metallic Nanowires 168
Pejman **Shayanfard**, Jindřich **Petruška**, Pavel **Šandera**, Jana **Horníková**, Petr **Šittner**, Jaroslav **Pokluda**
NiTi Self-expanding Vascular Stent Configuration and Biomedical Interaction with Artery: Finite Element Analysis 169
Sergiy **Kotrechko**, Volodymyr **Grishchenko**, Vladislav **Kozák**, Ivo **Dlouhý**
New Method of Threshold Stress Determination for Local Approach to Cleavage Fracture 170
Sergiy **Kotrechko**, Oleksandr **Ovsjannikov**, Tatjana **Mazilova**, Igor **Mikhailovskij**, Eugene **Sadanov**, Nataliya **Stetsenko**
Strength of Nano-sized Tungsten Crystals under Hydrostatic Tension 171
Walter **Ochensberger**, Otmar **Kolednik**
Numerical Assessment of the Fatigue Crack Growth Rate with the Cyclic J-integral 172
Daniel **Camas**, Pedro **Loureiro**, Pedro **Prates**, Fernando **Antunes**
Numerical Determination of Fatigue Threshold from CTOD 173
Karel **Slámečka**, Jan **Mička**, Tomáš **Vojtek**, Pavel **Gejdoš**, Marta **Kianicová**, Jana **Horníková**, Jaroslav **Pokluda**
Fatigue of 115CrV3 Steel under Combined Tension-compression/torsion Loading 174
Pietro Giovanni **Luccarelli**, Stefano **Foletti**, Garrett **Pataky**, Huseyin **Sehitoglu**
Crystal Plasticity Simulations of Haynes 230, an Analysis of Single Crystal and Polycrystalline Experiments 175
Petr **Řehák**, David **Holec**, Miroslav **Černý**
Interface Induced Electronic Structure Toughening of Nitride Superlattices 176
Zbyněk **Studený**, Zdeněk **Pokorný**, David **Dobrocký**
Fatigue Crack Surface Topography after Plasma Nitriding Proces 177
Guocai **Chai**, Mattias **Calmunger**, Sten **Johansson**, Johan **Moverare**
Toughening Behavior in Alloy 617 with Long Term Ageing 178
Petr **Šesták**, Petr **Řehák**, Miroslav **Černý**, Monika **Všianská**, Jianying **He**, Mojmír **Šob**, Zhiliang **Zhang**, Jaroslav **Pokluda**
Atomistic Simulations of Planar Defects: Assessment Evaluations of Present and New Methods for Computation of Strength of Grain Boundaries 179
Masoud **Sistaninia**, Otmar **Kolednik**
The Design of Fracture Resistant and Damage Tolerant Composites by Utilizing Spatial Variations of the Yield Stress 180
Hamid **Javadi**, Walid **Jomaa**, Damien **Texier**, Myriam **Brochu**, Philippe **Bocher**
The Effect of Machining Induced Surface Residual Stresses on the Fatigue Behavior of Inconel718 181
Mahmoud **Mousavi**
Cracks within Second Gradient Elasticity 182
Miroslav **Černý**, Petr **Šesták**, Jaroslav **Pokluda**
Ab initio Study of Stability and Phase Transitions in NiTi 183

Posters

Tomáš **Komárek**, Monika **Všianská**, Martin **Friák**, Mojmír **Šob**
Quantum-mechanical Comparative Study of Ground States in Fe3Al 184

Ivan **Volkov**, Igor **Vorobtsov**, Leonid **Igumnov**, Aleksandr **Ipatov**
Model of the Damaged Medium for the Assessment of Resource Characteristics of Structural Alloys for Degradation Mechanisms that Combine Fatigue and Creep of Material 185

Ivan **Volkov**, Leonid **Igumnov**, Svetlana **Litvinchuk**, Ivan **Markov**
Modeling of Deformation and Failure of Heat-resistant Alloys under Cyclic Thermo-mechanical Loading 186

Pavlína **Škarková**, Karel **Novotný**, Přemysl **Lubal**, Alžběta **Jebavá**, Pavel **Pořízka**, David **Prochazka**, Aleš **Hrdlička**, Jozef **Kaiser**
Laser-induced Breakdown Spectroscopy 2D Distribution Mapping of Quantum Dots 187

Vladimír **Starý**, Ladislav **Cvrček**, Stanislav **Daniš**, Jan **Krčil**, Jaroslav **Málek**, Zdeněk **Tolde**
Characterisation of TiNb Films on Titanium Alloys for Hard Tissue Replacement 188

Vasile Danut **Cojocaru**, Ion **Cinca**, Nicolae **Serban**, Doina Margareta **Gordin**, Lucia Maria **Angelescu**, Elisabeta Mirela **Cojocaru**, Doina **Raducanu**
332(113) Twinning Deformation in a Cold-rolled Biocompatible Ti-Nb-Zr-Fe Alloy 189

Vsevolod **Zhuikov**, Anton **Bonartsev**, Dmitry **Bagrov**, Garina **Bonartseva**, Alexey **Rusakov**, Alexey **Useinov**
The Changes in Surface Morphology and Mechanical Properties of Poly (3-hydroxybutirate) Films during in Vitro Degradation 190

Yuliya **Chudinova**, Denis **Kurek**
Molecular Architecture of Natural Polysaccharide Based Thin Films 191

Petr **Marcián**, Zdeněk **Florian**, Ladislava **Horáčková**, Jozef **Kaiser**, Libor **Borák**
Microstructural Finite-element Analysis of Influence of Bone Density and Histomorphometric Parameters on Mechanical Behaviour of Mandibular Cancellous Bone Structure 192

Massimo **Rogante**, Vladimír **Havránek**, Pavol **Mikula**, Vasyl **Ryukhtin**
Nanostructural Investigation by Small Angle Neutron Scattering (SANS) of Case Hardened Steels for Speed Gears Applications 193

Alexander **Bakulin**, Alexander **Latyshev**, Svetlana **Kulkova**
Absorption and Diffusion of Oxygen in Ti-Al Bulk Alloys 194

Jakub **Klus**, David **Prochazka**, Pavel **Pořízka**, Jan **Novotný**, Karel **Novotný**, Jozef **Kaiser**
Study of Sandstone-hosted Uranium Ore Chemical Composition by Means of Laser Induced Breakdown Spectroscopy 195

Mariano **Casas Luna**, Edgar B. **Montufar**, Miroslava **Horynová**, Pavel **Gejdoš**, Lenka **Klakurková**, Sebastián **Díaz de la Torre**, Jozef **Kaiser**, Ladislav **Čelko**
Structure and Properties of Calcium Phosphate - Magnesium Interface Processed by Spark Plasma Sintering 196

Barbora **Kudláčová**, Josef **Sedlák**, Aleš **Jaroš**, Martin **Slaný**
Application of Fused Deposition Modelling Method to Production of Planetary Mechanism Model 197

Tomáš **Trčka**, Robert **Macků**, Pavel **Koktavý**, Pavel **Škarvada**, Ivo **Baron**, Josef **Stemberk**
Field Measurement of Natural Electromagnetic Emissions near the Active Tectonic and Mass-movement Fractures in Caves. 198

Ivo **Kusák**, Miroslav **Luňák**, Maria **Míková**, Pavel **Rovnaník**
Influence of Carbon Admixtures to the Electrical Conductivity of Slag Mortars 199
Dalibor **Bartoněk**, Jiří **Bureš**
Optimization of Process Field Measurement GNSS-RTK for Railway Infrastructure 200
Pavel **Škarvada**, Robert **Macků**, Ľubomír **Škvarenina**
Performance of Cu(In,Ga)Se2 Flexible Solar Cells and Microstructure Investigation 201
Ľubomír **Škvarenina**, Robert **Macků**
Solar Cell Microstructure Defects Investigations via Electrical Current Fluctuations 202
Vendula **Kratochvílová**, Lucie **Zemanová**, František **Vlašic**, Pavel **Mazal**
Study of Initial Stages of Fatigue Process in Selective Laser Melting Material Using Acoustic Emission Method 203
Dragan **Pustaić**, Franjo **Cajner**, Vojteh **Leskovšek**
Investigation of Heat Treatment Influence on Microstructure of High-speed Steel and its Resulting Mechanical Properties 204
Janusz **Lewandowski**, Dariusz **Rozumek**
Influence of Fillet Welded Joints Subjected to Cyclic Bending on Fatigue Crack Growth in S355 Steel 205
Luboš **Pazdera**, Libor **Topolář**, Petr **Daněk**, Jaroslav **Smutný**, Karel **Mikulášek**
Evaluation of Acoustic Emission Events Generated at Three Point Bending of Different Concrete Specimens by Spectral Analysis 206
Mariusz **Prażmowski**, Dariusz **Rozumek**, Henryk **Paul**
Influence of Microstructure on the Fatigue Cracks Growth in the Joint Zirconium-steel Made by Explosive Welding 207
Vlastimil **Bílek Jr.**, Hana **Šimonová**, Ivana **Havlíková**, Libor **Topolář**, Barbara **Kucharczyková**, Zbyněk **Keršner**
Alkali Activated Binders Based Concrete Specimens: Length Change and Fracture Tests 208
Joo-Hag **Kim**, Jong-Wook **Kim**, Keun-Bae **Park**
Characterization of Neutron Irradiated Ni-Cr-Fe Alloy for Integral Reactor Application 209
Jiří **Buršík**, Ivo **Kuběna**, Vilma **Buršíková**, Pavel **Souček**, Lukáš **Zábranský**, Saeed **Mirzaei**, Petr **Vašina**
W-B-C Nanostructured Layers – Microstructure and Mechanical Properties 210
Anatoly **Bragov**, Leonid **Igumnov**, Aleksandr **Konstantinov**, Andrey **Lomunov**
Analysis of Dynamic Properties of Nanocomposite Fluid 211
Hynek **Hadraba**, Roman **Husák**, Luděk **Stratil**, Viktor **Puchý**
Influence of Yttria and Alumina Nano-particles to Mechanical Properties of 9-17Cr ODS Steels 212
Anna **Hojná**, Hynek **Hadraba**, Fosca **Di Gabrielle**, Roman **Husák**, Ivo **Kuběna**, Lucia **Rozumová**, Daniela **Marušáková**
Corrosion-mechanical Behaviour of T91 and 9-20Cr ODS Steels Exposed to Flowing Lead-bismuth. 213
Jakub **Somer**, Martin **Klíma**, Petr **Macháč**, Ivan **Szendiuch**
Joining LTCC, Al2O3 and SiC Substrates for Higher Operating Temperature Applications 214

Michal **Junek**, Marie **Svobodová**, Jiří **Janovec**, Jakub **Horváth**
Mechanical Properties and Microstructures of Narrow Gap Orbital Welded P91 Steel 215
Jakub **Horváth**, Jiří **Janovec**, Michal **Junek**
The Changes in Mechanical Properties of Austenitic Creep Resistant Steels SUPER 304H and HR3C Caused by Medium-term Isothermal Ageing 216
Monika **Manychová**, Ondřej **Fuciman**, Luboš **Pazdera**
An Initial Investigation on the Potential Applicability of Non-destructive Methods to Assessing Joint Condition in Prefabricated Structures 217
Stanislav **Žák**, Jana **Horníková**, Pavel **Šandera**
Stress Intensity Factors for Rough Cracks Loaded in Mode II 218
Ivo **Šulák**, Karel **Obrtlík**, Ladislav **Čelko**, Pavel **Gejdoš**
High Temperature Degradation of YSZ/EUCOR TBC Coating System during Low Cycle Fatigue Tests 219