

Table of Contents

Preface

Chapter 1: Plenary Keynotes

Microscopic Mechanism of Hydrogen Embrittlement in Fatigue and Fracture Y. Murakami, J. Yamabe and H. Matsunaga	3
3D Studies of Indentation by Combined X-Ray Tomography and Digital Volume Correlation M. Mostafavi, Y. Vertyagina, C. Reinhard, R. Bradley, X. Jiang, M. Galano and J. Marrow	14
Influence of Microstructure, Environment and Temperature on Fatigue Crack Propagation in 2XXX Aluminium Alloys J. Petit, C. Sarrazin-Baudoux and M. Gerland	22
Analysis of Fatigue Damage Accumulation in TiAl Intermetallics S. Beretta, M. Filippini, L. Patriarca and S. Sabbadini	30

Chapter 2: Atomistic Studies on Deformation and Fracture

Atomistic Model Analysis of Local and Global Instabilities in Crystals at Finite Temperature Y. Umeno, W. Nöhring, A. Iskandarov and E. Bitzek	39
Stress Analysis of Highly Constrained Copper Strips with through Crack Shaped Voids Using Molecular Dynamics D. Johansson, P. Hansson and S. Melin	43
Dynamic Stability of Ni FCC Crystal under Isotropic Tension P. Reháč and M. Cerný	47
Structural Transformation in Nanowires CuAu I with Superstructure of L10 of Tetragonal Symmetry at Uni-Axial Tension Deformation M.D. Starostenkov, A. Yashin and N. Sinica	51
Structural Response of Metal Crystallite with BCC Lattice on Atomic Level under Nanoindentation D.S. Kryzhevich, A.V. Korhuganov, K.P. Zolnikov and S.G. Psakhye	55

Chapter 3: Deformation and Fracture Models Based on Crystal Defects Behaviour

Comparison between Pile-Up Singularities and Stress Fields Induced by Thin Slip Bands. Application to the Prediction of Grain Boundary Microcrack Nucleation M. Sauzay and M.O. Moussa	61
Planar Defects and Dislocations in C40 and FCC Lattices V. Paidar	67
Thermally Activated Dislocation Motion in an AS21 Alloy and Alloy Reinforced with Short Ceramic Fibres Studied at Elevated Temperatures Z. Zdražilová, Z. Trojanová, K. Máthis and P. Lukáč	71
Deformation and Fracture of a Magnesium Alloy at Elevated Temperatures P. Lukáč, T. Donič, M. Chalupová, P. Palček, Z. Trojanová, E. Tillová, S. Rusz and R. Bastovansky	75
Thermodynamics of Dislocation Pattern Formation at the Mesoscale R. Gröger	79
Modeling and Experimental Study of Long Term Creep Damage in Austenitic Stainless Steels Y.T. Cui and M. Sauzay	83
3D Discrete Dislocation Dynamics Applied to a Motion of Low-Angle Tilt Boundaries T. Zálezák and A. Dlouhý	87

Lattice-Spring Modeling of Graphite Accounting for Pore Size Distribution C.N. Morrison, A.P. Jivkov, G. Smith and J.R. Yates	92
Non-Planar Dislocations in MoSi₂ V. Paidar and V. Vitek	96
Deformation and Fracture of Hydrogenated GaSe and InSe Layered Crystals O.A. Balitskii, J. Elias, S.A. Gryshchenko and N.M. Polishchuk	100

Chapter 4: Mathematical Modeling Microstructure, Deformation and Fracture

A Contribution to the Physical Interpretation of the Morphology of Fatigue Fracture Surfaces H. Lauschmann and O. Kovářik	107
The Simulation of the Fatigue Fracture Process at Random Loading V.V. Nikonov and V.S. Shapkin	113
Numerical Life Estimation of Structure Components Subjected to Hydrogen Embrittlement and Cycling P.V. Tarakanov, A. Romanov and G.V. Shashurin	117
Mathematical Model of Fan-Head Shear Rupture Mechanism B. Tarasov and M.A. Guzev	121
Jet Theory in Microstructures M. Kureš	125
Thermodynamically Consistent Model of Damage in Laminated Rocks O. Izvekov and V. Pavlov	129
Micromechanics of Discontinuities and High Porosity Bands Formation in the Unconsolidated Sedimentary Rocks S.A. Mukhamediev and D.A. Ul'kin	133
Micromechanical Modelling of Advanced Ceramics with Statistically Representative Synthetic Microstructures P. Alveen, D. McNamara, D. Carolan, N. Murphy and A. Ivanković	137
Mass-Velocity Correlation in Impact Fragmentation G. Pál, I. Varga and F. Kun	141
Modelling of Thermal Fracture of Functionally Graded/Homogeneous Bimaterial Structures under Thermo-Mechanical Loading V. Petrova and S. Schmauder	145
Compression of Heterogeneous Material Systems Based on Wang Tilings M. Doškář and J. Novák	149
Numerical Investigation on the Size Effect of a WC/Co 3D Representative Volume Element Based on the Homogenized Elasto-Plastic Response and Fracture Energy Dissipation U.A. Ozden, G. Chen, A. Bezold and C. Broeckmann	153
Identification of Structural Parameters of Metal Fibre Concrete Using Magnetic Approach J. Vala and L. Hobst	157
Dynamic Recrystallization of the Alloy Fe-40at.%Al-Zr-B I. Schindler, P. Kawulok, R. Kawulok and S. Ruzs	161
Inaccuracy in Residual Stress Estimation and its Influence on the Residual Lifetime of Polymer Pipes M. Ševčík, J. Poduška, L. Náhlík, J. Kučera and P. Hutař	165
Criterion for Crack Kinking out of the Interface of Two Orthotropic Layers Subjected to Thermal and Mechanical Loading P. Damborský, O. Ševeček, T. Profant and M. Kotoul	169
The Experimental Study and Numerical Estimation of Fracture Toughness of Heterogeneous Welded Joints E. Moskvichev	173
Critical Value for Crack Propagation from Sharp V-Notch L. Náhlík, K. Štegnrová, P. Hutař and Z. Majer	177
Strength of an Elastic Plane with a Square Lattice of Circular Holes under External Loading V. Mokryakov	181

Evaluation of Three-Point Bending Fracture Tests of Concrete Specimens with Polypropylene Fibres via Double-K Model	
I. Havlíková, R.V. Majtánová, H. Šimonová, J. Láník and Z. Keršner	185
Fracture-Micromechanics Based Model of Mortars Susceptible to Shrinkage	
V. Nežerka, P. Tesárek and J. Zeman	189
Crack Growth Modelling in the Silicon Nitride Ceramics by Application of the Cohesive Zone Approach	
V. Kozák and Z. Chlup	193
Temperature Field and Solidification Structure of a Ductile-Cast-Iron Roller	
F. Kavička, J. Dobrovská, K. Stránský, B. Sekanina and J. Stetina	197
The Use of Computer Simulation in the Electronic Packaging Process	
B. Psota, M. Buršík and I. Szendiuch	201
Numerical Simulation of Damage to Fracture Transition in Metals Based on the Statistical Model of Mesodefekt Evolution	
A. Kostina, Y. Bayandin, O. Naimark and O. Plekhov	205
Application of Multi-Parameter Fracture Mechanics to Study of Crack Propagation Angle in Selected Mixed-Mode Geometry	
L.Š. Malíková and V. Veselý	209
Numerical Model of Plate from Hollow Core Panels with Contact – Target Pairs	
J. Kršík and J. Křiváková	213
A Numerical Estimation of Fatigue Crack Tip Plastic Zone Size and Shape under Mixed-Mode Loading Condition	
J. Ondráček, A. Materna and V. Oliva	217
Interrelation between Local and Global Characteristics of Cleavage Fracture	
V. Grishchenko, S. Kotrechko, S. Mamedov, O. Zatsarna and I. Dlouhý	221
An Experimental, Numerical and SEM Study of Fracture in a Thin Polymer Film	
E. Andreasson, N. Mehmood, T. Mao and S. Kao-Walter	225
Stochastic Fracture Simulations of Concrete Beams with Shallow Notches	
J. Eliáš and M. Vořechovský	229
Contribution to the Life Prediction of Aluminium Alloys Parts under Isothermal Fatigue	
A. Belkherchouche, A. Boudiaf and M.E.A. Belouchrani	233

Chapter 5: Multiaxial Deformation and Fracture, Experiment and Modeling

Damage Mechanics and Critical Plane Approach to Multiaxial Fatigue	
R. Brighenti and A. Carpinteri	239
Modeling of Fatigue Crack Initiation in Wire-Bonds Using a Novel Approach of Strain Gradient Theory	
M. Lederer, G. Khatibi, D. Thuiner and H. Danninger	246
Crack Growth Tendency of Surface Shear Cracks in Rolling Sliding Contact	
W. Daves, W.P. Yao and S. Scheriau	250
Fatigue Crack Propagation in Steels for Railway Axles	
L. Náhlík, P. Pokorný, P. Hutař and P. Matušek	254
Calibration of Selected Ductile Fracture Criteria Using Two Types of Specimens	
P. Kubík, F. Šebek, J. Petruška, J. Hůlka, J. Růžicka, M. Španiel, J. Džugan and A. Prantl	258
Estimation of the Zone of Failure Extent in Quasi-Brittle Specimens with Different Crack-Tip Constraint Conditions from Stress Field	
V. Veselý, J. Sobek, P. Frantík, M. Štafa, L. Šestáková and S. Seitl	262
Geometry Transferability of Lemaitre's Continuum Damage Mechanics Model in the Plane Stress Specimens	
N. Allahverdizadeh, A. Manes, M. Giglio and A. Gilioli	266
Localized Plastic Flow Autowaves and the Hall-Petch Relation for Al	
L.B. Zuev and N. Zarikovskaya	271
On the Correlation of Fracture Quantities in Small Punch Test	
F. Dobeš and P. Dymáček	275
Influence of the Microstructure on the Fracture Behavior of Carbon Bonded Alumina	
S. Soltysiak, M. Abendroth, M. Kuna and S. Dudezig	279

Mixed Mode Interlaminar Fracture of Carbon Nanotubes Enhanced Epoxy/Glass Fiber Composites	
H. Silva, J.A.M. Ferreira, J.D.M. Costa and C. Capela	283
Features of Shock-Wave Processes and Fracture in Anisotropic Materials	
A. Radchenko, P. Radchenko and S. Batuev	287
Failure Mechanisms of an AISI 4135 Steel Submitted to the Disk Pressure Test under Helium and Hydrogen Gas	
K. Ardon, M. Gasperini, Y. Charles and J. Furtado	291
Measurement of Residual Stresses around the Notch of Tensile Specimens of the High-Cr Tempered Martensitic Steel F82H-Mod	
N. Ilchuk, P. Spätig, V. Davydov and S. van Petegem	295

Chapter 6: Nanomaterials: Technology, Properties and Modeling

Strength Hierarchy for Nano-Sized Crystals	
S. Kotrechko, I. Mikhailovskij, T. Mazilova and O. Ovsjannikov	301
Grain Refinement and Deformation Behaviour of Medium Carbon Steel Processed by ECAP	
J. Zrník, S. Dobatkin and L. Kraus	307
Deformation Mechanisms in Ultrafine-Grained Zn at Different Strain Rates and Temperatures	
P. Jenei, G. Dirras, J. Gubicza and H. Couque	313
Interface Influence on Dispersion Dynamic of Metal Nanowires under Electric Pulse Loading	
K.P. Zolnikov, D.S. Kryzhevich, A.V. Abdrashitov and S.G. Psakhye	317
Details of the Formation of Superstructures in the Process of Ordering in Cu-Pt Alloys	
M.D. Starostenkov, A. Chaplygina and V. Romanenko	321
Preparing of Silver Nanoparticles by Selective Dissolving of Aluminium Matrix	
I. Marek, A. Michalcová, D. Harabišová and D. Vojtěch	325
Glass Surface Refining by Deposition of Nano-Particles	
M. Drąjewicz and P. Rokicki	329

Chapter 7: Biomaterials: Deformation, Fracture, Modeling

Quantum-Mechanical Study of Single-Crystalline and Polycrystalline Elastic Properties of Mg-Substituted Calcite Crystals	
M. Friák, L.F. Zhu, L. Lymperakis, H. Titrian, U. Aydin, A.M. Janus, H.O. Fabritius, A. Ziegler, S. Nikolov, P. Hemzalová, D. Raabe and J. Neugebauer	335
Porous Magnesium for Medical Applications - Influence of Powder Size on Mechanical Properties	
J. Čapek and D. Vojtěch	342
Fractographic Analysis of Surface and Failure Mechanisms of Nanotitanium after Laser Shock-Wave Treatment	
P. Maruschak, A. Menou, M. Czausow and V. Mocharskyi	346
Multiscale Heterogeneity of Bone Microporosities and Tissue Scaffolds	
P. Kochová, T. Gregor, E. Prosecká, L. Eberlová and Z. Tonar	350
Analysis of Compressive Properties of Porcine Temporomandibular Joint Disc	
M.J. Lámela, F. Pelayo, A. Ramos, A.F. Canteli and E. Tanaka	354
Experimental Studies of Elastic Properties of Dental Enamel and Photopolymer Used for early Caries Treatment	
A.Y. Beliaev, O.S. Gileva, A.L. Zuev and M.A. Muraveva	358
Mathematical Modeling of Caries Initiation and Progression Occurring in Dental Enamel	
R.I. Izyumov, S.V. Rusakov, A.L. Zuev, O.S. Gileva and M.A. Muraveva	362
Evaluation of Developed Texture during Cold-Rolling Deformation of Ti-Nb-Ta-Zr Biocompatible Alloy	
V.D. Cojocaru, I. Thibon, D. Raducanu, I. Cinca, T. Gloriant and D.M. Gordin	366

Recrystallization Temperature Influence upon Structural Changes of 90% Cold Rolled Ti-29Nb-9Ta-10Zr Biocompatible Alloy C.M. Tabirca, T. Gloriant, D.M. Gordin, I. Thibon, D. Raducanu, I. Cinca, C.I. Nae, A. Caprarescu and V.D. Cojocaru	370
The Impact of Graphite Source and the Synthesis Method on the Properties of Graphene Oxide L. Richtera, J. Omelková, R. Bálková, M. Zmrzlý, J. Másilko and S. Hermanová	374
Computational Modeling of Porous Ceramics with Bioactive Layer P. Marcián, J. Valášek, M. Hrstka, Z. Majer, O. Ševeček, T. Profant, I. Dlouhy and Z. Florian	378
Local Mechanical Properties of Various Bone Cements P. Hvizdoš, D. Jakubéczyová, S. Hloch, J. Křoc, J. Balko and P. Monka	382

Chapter 8: Surface and Interface Microstructure and Properties

Solute Interaction in Grain Boundary Segregation and Cohesion P. Lejček	389
On the Micromechanisms of Fatigue Crack Propagation in Aluminum Cast Alloys U. Krupp, A. Gierler, S. Siegfanz and W. Michels	393
High-Density Ceramic Materials on the Basis of Silicon Carbide D.S. Dallaeva, G.D. Kardashova, G.K. Safaraliev and P. Tománek	397
Fibre-Matrix Interface Development during High Temperature Exposition of Long Fibre Reinforced SiOC Matrix Z. Chlup, M. Černý, A. Strachota, M. Halasová and I. Dlouhý	401
Estimation of Apparent Fracture Toughness of Alumina Based Ceramic Laminate B. Máša, L. Náhlík and P. Hutař	405
Siliconizing in a Fluidized Bed Reactor K. Anthymidis, K. David, A. Trakali and D.N. Tsipas	409
Microstructure-Based Life Prediction of Thermal Barrier Coatings R. Eriksson, K. Yuan, S. Johansson and R.L. Peng	413
Nanoindentation of Thin Copper Coatings P. Hansson and M. Jansson	417
Influence of Low Pressure Plasma Spraying Parameters on MCrAlY Bond Coat and its Microstructure M. Góral, S. Kotowski, K. Dychtoń, M. Drajewicz and T. Kubaszek	421
Fatigue Response of Hybrid Ti/APC-2 Nanocomposite Laminates with Single-Edged Cracks M.H.R. Jen, C.K. Chang and B.C. Lin	425
Surface Relief Evolution in IN792-5A Nickel Superalloy under High Temperature Fatigue Straining with Hold Times M. Šmíd and K. Obrtlík	429
The Changes of Fatigue Properties in Aluminium Cast Alloy during Solution Treatment L. Hurtalová, E. Tillová and M. Chalupová	433
Characteristics of Duplex Treated AISI 304 Stainless Steel Z. Joska, J. Kadlec, V. Hruby, Z. Studeny and T. Binar	437
Influence of Localized Structural Defects on the PN Junction Properties P. Škarvada, P. Tománek and J. Šicner	441
Particulate Composite Damage: Numerical Estimation of Micro-Crack Propagation Direction Z. Majer, P. Marcián, L. Náhlík, P. Hutař and Z. Knésl	445
Study of the Influence of Structural Defects on Properties of Silicon Solar Cells J. Šicner, P. Škarvada, R. Macků and P. Koktavý	449
Investigation of the Mechanical Properties of Lead-Free Solder Materials A. Otáhal, M. Adamek, V. Jansa and I. Szendiuch	453
Photo-Reflective Layer on Low Temperature Co-Fired Ceramic for Optical Applications M. Klíma, M. Holík, V. Svatos, J. Hubálek, I. Szendiuch and F. Urban	457
Degradation of TBC Coating during Low-Cycle Fatigue Tests at High Temperature S. Hutařová, K. Obrtlík, M. Juliš, L. Čelko, M. Hřčková and T. Podrábský	461

Assessment of the Unstressed Lattice Parameters for Residual Stresses Determination by Neutron Diffraction in Engineering Materials M. Rogante, P. Mikula and M. Vrána	465
The Influence of Long-Term Heat Treatment on Microstructure of Zr-Modified Aluminide Coating Deposited by CVD Method on MAR M200+Hf Nickel Superalloy R. Filip, M. Góral, M. Zawadzki, A. Nowotnik and M. Pytel	469
Thermal Analysis of Halide Activator Used in Aluminizing of TiAl Intermetallics K. Dychtoń, R. Przeliorz, M. Góral and J. Sieniawski	473
The Effect of Long-Term Annealing on Microstructure of Aluminide Coatings Deposited on MAR M200 Superalloy by CVD Method A. Nowotnik, J. Sieniawski, M. Zawadzki and M. Góral	477

Chapter 9: Advanced Experimental and Theoretical Methods for Microstructure Investigation

Complex Metallic Alloys – Microstructure Characterization J. Janovec, I. Černíčková and P. Priputen	483
Kinetics of Deformation Processes in a High-Alloy Cast TWIP Steel Determined by Acoustic Emission and Scanning Electron Microscopy A. Weidner, A. Vinogradov, A. Lazarev and H. Biermann	489
Microscopic Strain and Crystal Rotation Measurement within Metallurgical Grains F. Bridier, J.C. Stinville, N. Vanderesse, P. Villechaise and P. Bocher	493
Advanced Microstructure Studies of an Austenitic Material Using EBSD in Elevated Temperature <i>In Situ</i> Tensile Testing in SEM M. Calmunger, R.L. Peng, G.C. Chai, S. Johansson and J. Moverare	497
A Comparative Study on Infrared Thermography during Ultrasonic Fatigue Testing of Cast Steel 42CrMo4 and Cast Aluminium Alloy AlSi7Mg D. Krewerth, A. Weidner and H. Biermann	501
Quantification of Liver Microcirculation Using X-Ray Microtomography of Vascular Corrosion Casts A. Králíčková, L. Eberlová, K. Kalusová, T. Gregor, P. Kochová, V. Liška, M. Králíčková and Z. Tonar	505
Experimental Study of Defect Induced Temperature Evolution in Polycrystalline Metals O. Plekhov and O. Naimark	509
Effect of Heat Treatment on Formation of Al-Al₃Ni Hypereutectic Alloys L. Čelko, L. Klakurková, K. Slámečka, B. Smetana, T. Płociński, J. Grzonka, M. Žaludová, M. Lewandowska and J. Švejcar	513
Formation of Structurally Complex U-Phase in Al₇₂Pd_{12.8}Co_{15.2} Alloy I. Černíčková, P. Švec, E. Illeková, D. Janickovic, P. Priputen and J. Janovec	517
Using Acoustic Emission in Fracture Monitoring of Cementitious Composites G. Cséfalvay, T. Trčka, O. Vodák and P. Sedlak	521
Influence of the Surface Treatment of Tubes on the Heat Transfer in Low Pressure Atmosphere L. Šnajdárek, P. Kracík and J. Pospíšil	525
Experimental Studies of Excess Noise Sources in Concrete Based Materials as a Limiting Factor for Electromagnetic Emission Measurement R. Macků, P. Koktavý, T. Trčka and V. Holcman	529
Mechanical Induced Defects and Fractures in the Silicon Solar Cell Structure R. Macků, P. Koktavý, J. Šicner and V. Holcman	533
Comparing the Properties of Polypropylene Fibers Contained in Ordinary and Lightweight Concrete Using Three-Point Bending Tests with Stress Concentrator and Acoustic Emission Method T. Trčka, J. Láník and R. Macků	537
A FPGA-PC Based Acoustic Emission System with Logarithmic Preamplifier for Fracture Monitoring M. Vondra, G. Cséfalvay and P. Sedlak	541
Monitoring of the Damage in Stone Blocks by Means of Non-Destructive Methods M. Kořenská, M. Manychova, L. Pazdera and L. Topolář	545

Detection of Inhomogeneities and Cracks in Composite Materials by the Method of Partial Discharges	
P. Koktavý, T. Trčka, B. Koktavý and R. Stoudek	549
Study of Initial Stages of Fatigue Process Using Non-Destructive Testing Methods	
F. Vlasic, J. Volák, L. Nohál, P. Mazal and F. Hort	553
Microstructural Investigations of Nickel-Based Superalloys with Different Structure	
M. Pytel, A. Nowotnik, D. Szeliga and J. Sieniawski	557

Chapter 10: Experimental Studies on the Relation between Microstructure and Mechanical Properties

Advanced 3D Packaging of Chips and Materials Integrity: Stress-Induced Effects and Mechanical Properties of New Ultra Low-k Dielectrics for On-Chip Interconnect Stacks	
C. Sander, M. Gall, K.B. Yeap and E. Zschech	563
Fracture of Irradiated Austenitic Stainless Steel with Special Reference to Irradiation Assisted Stress Corrosion Cracking	
A. Hojna, J. Michalicka and O. Srba	569
The Effect of Radiation-Induced Structural Changes under Accelerated Irradiation on the Behavior of Water-Cooled Reactor Pressure Vessel Steels	
B.A. Gurovich, E.A. Kuleshova, D.A. Maltsev, O. Zabusov, K. Prikhodko, A. Frolov, S.V. Fedotova, D. Erak, Z. Denis and M. Saltykov	573
Intergranular Embrittlement of Nuclear Reactor Pressure Vessel Steels	
O.O. Zabusov, B.A. Gurovich, E.A. Kuleshova, M.A. Saltykov, S.V. Fedotova and A.P. Dementjev	577
Influence of Morphology of Deformation Induced α'-Martensite on Stress-Strain Response in a Two Phase Austenitic-Martensitic-Steel	
R. Skorupski, M. Smaga, D. Eifler, R. Schmitt and R. Müller	582
Microstructure-Related Scratch Resistance and Indentation Creep Behavior of PA6 and PA6 Nanocomposites	
J. Rybníček, R. Lach, J. Schöne, D. Tondl, S.R. Dominguez, R. Valek and W. Grellmann	586
Damage and Fracture Behaviours in Aged Austenitic Materials during High-Temperature Slow Strain Rate Testing	
M. Calmunger, G.C. Chai, S. Johansson and J. Moverare	590
Structural and Fatigue Properties of Titanium-Steel Bimetallic Composite Obtained by Explosive Welding Technology	
A. Karolczuk and M. Kowalski	594
Structural Modifications of the Aluminium Alloy in Conditions of Additional Shock Impulse Load	
V. Hutsaylyuk, M. Czausow, L. Śnieżek, A. Pylypenko, T. Ślęzak and V. Berezin	598
Influence of Cooling Rate on Final Properties of Laboratory Rolled Products	
P. Kawulok, I. Schindler, K.M. Čmiel, J. Sojka, S. Rusz and R. Kawulok	602
Extrapolation of Sigmoidal Creep Curve by Strain Acceleration Parameter	
H. Sato, K. Omote, A. Sato and K. Ueno	606
Determining Elastic-Plastic Properties of Al6061-T6 from Micro-Indentation Technique	
S. Amiri, N. Lecis, A. Manes, D. Mombelli and M. Giglio	610
Production of Al Metal Matrix Composites by the Stir-Casting Method	
K. Anthymidis, K. David, P. Agrianidis and A. Trakali	614
Elastic Properties of Porous Alumina, Zirconia and Composite Ceramics	
W. Pabst, E. Gregorová, T. Uhlířová, A. Musilová and Z. Andelová	618
Standing Contact Fatigue Analyse of Steels with Different Microstructures	
E. Vuorinen, N.K. Ranga, M. Linz, A. Kankanala and F. Bäck	622
High Temperature Fatigue Strength and Quantitative Metallography of an Eutectic Al-Si Alloy for Piston Application	
R. Konečná, S. Fintova, G. Nicoletto and E. Riva	627
Effects of Different Microstructure on Resistance of EA4T Railway Axle Steel of Equal Strength to Fatigue Crack Growth	
I. Černý and V. Linhart	631

Investigation of the Microstructure Factors Affecting the Brittle Fracture Initiation of Pre-Cracked Charpy-Type Samples of VVER-1000 RPV Steel E.A. Kuleshova, M.A. Artamonov and A.D. Erak	635
Microstructure and Mechanical Properties of Rapidly Solidified Al-Fe-X Alloys M. Voděrová, P. Novák, I. Marek and D. Vojtech	639
Heat Treatment Effects on Static and Dynamic Mechanical Properties of Sintered SINT D30 Powder Metal M. Šori, T. Verlak and S. Glodež	643
Influence of the Composition of Cement Mortars Modified by Lime or Polymers on the Mechanical Properties and Microstructure of Mortars M. Lenart	647
Influence of Fly Ash on Abrasion Resistance of Concretes with their Additions A. Nowak-Michtha	651
Relation between Microstructure and Tribological Properties of High Density Polyethylene Hybrid Composites Filled with Untreated Glass Spheres, Talc and Calcium Carbonate M. Taşdemir	655
Influence of Heat Treatment on Crack Tip Opening Displacement and on Resistance of Crack Propagation of Alloyed Steel D. Pustačić and F. Cajner	660
Autowave Features of Plastic Deformation by Ductile Fracture D. Orlova, V. Danilov and L.B. Zuev	664
Effect of Adding Graphite Powder to a UP Polymer on Friction and Wear for Different Loads and Rubbing Speeds S. Larbi, S. Djebali and A. Bilek	668
Mechanical Behavior of Steel-Chips-Reinforced Concrete S. Djebali, Y. Bouafia, S. Larbi and A. Bilek	672
Acoustic Emission from Quasi-Brittle Failure of Cementitious Composites - Experimental Measurements and Cohesive Crack Model Simulations V. Veselý, O. Vodák, T. Trčka, J. Sobek, P. Koktavý, Z. Keršner and B. Koktavý	676
Influence of Heat Treatment of High-Speed Steel on its Microstructure, Hardness and Fracture Toughness F. Cajner, V. Leskovšek and D. Pustačić	680
Fatigue Characteristic of Aluminium Alloy 2024 under Cyclic Bending with the Controlled Energy Parameter E. Marcisz, Z. Marciniak, D. Rozumek and E. Macha	684
Microstructure and Defects Evaluation of Varistors by Ultrasonic Waves in Low Frequency Range P. Tofel, P. Škarvada, J. Sikula and G. Cséfalvay	688
Influence of the Titanium and its Alloys Microstructure on the Fatigue Crack Paths D. Rozumek, M. Hepner and S. Faszyńska	692
High-Temperature Elastic Properties of Ceramics in the System MgO-Al₂O₃-SiO₂ Measured by Impulse Excitation E. Gregorová, W. Pabst, A. Musilová, M.A. Camerucci, M.L. Sandoval and M.H. Talou	696
Thermal Effects while Fatigue Cracking Growth under Bending D. Rozumek and N. Szmolke	700
Influence of the Microstructure near the Interface on the Fatigue Life of Explosively Welded (Carbon Steel)/Zr Clads M. Prażmowski, H. Paul, D. Rozumek and E. Marcisz	704
Microstructural Aspects of Low Cycle Fatigue of Aged GX12CrMoVNB9-1 Cast Steel S. Mroziński, G. Golański and K. Werner	708
Fatigue Fracture of Turbine Blades: Case Studies M. Kianicová and J. Pokluda	712
Bending Fatigue Behaviour of Diffusion and Thermal Barrier Coating Systems K. Slámečka, K. Němec, L. Čelko, M. Kianicová, J. Horníková, J. Pokluda and J. Švejcar	716
Nanoindentation and Microstructural Study of Cu-Co Alloys after Severe Plastic Deformation J. Buršík, P. Král, M. Svoboda, J. Dvořák and V. Sklenička	720
Mechanical Aspects of Plastic Deformation of Nickel Based Superalloy A. Nowotnik, P. Rokicki, P. Pędrak, S. Kotowski, J. Sieniawski and G. Mrówka-Nowotnik	724

Chapter 11: Micromechanisms of Fracture and Fatigue (ESIS TC2)

Fatigue Cracking and Acoustic Emission Regularities in Metals: Crack Origination and Growth

A. Shanyavskiy and M. Banov 735

Deformation Behaviour of Asymmetrically Fatigue Cycled Metallic Materials

K. Dutta and K.K. Ray 741

An Effect of the First Non-Singular Term of the Williams Asymptotic Expansion to the Stability of the Bi-Material Orthotropic Notch

T. Profant, J. Klusák, O. Ševeček, M. Kotoul, M. Hrstka and P. Marcián 745

Fatigue Crack Growth of Thin Wall Magnesium AZ91 Alloy Cast

T. Brynk, B. Romelczyk-Baishya, A. Jastrzębska, K. Nowak and Z. Pakiela 749

Short Crack Growth Behavior in Ferrite-Bainite Dual Phase Steels

A. Kumar and K.K. Ray 753

A Discrete Model for Diffusion-Induced Grain Boundary Deterioration

A.P. Jivkov and J.R. Yates 757

Role of Microstructure on Fracture Behavior of T91 Steel in Presence of Liquid Sodium

O. Hamdane, J.B. Vogt and I. Proriol-Serre 761

Transition from Straight to Fractal Cracks due to Projectile Penetration

Z. Halász, F. van Steeden and F. Kun 765

The Effect of Temperature on the Course of Refractory Castables Cracking

R. Suwak and J. Wojsa 769

Temporal and Spatial Evolution of Bursts in a Fiber Bundle Model of Creep Rupture

Z. Danku and F. Kun 773

PSBs and Non-Propagation of Small Surface and Interior Cracks in Polycrystalline Copper

S.E. Stanzl-Tschegg and B.M. Schönbauer 777

The True Shape of Persistent Slip Markings in Fatigued Metals

J. Polák, J. Man and I. Kuběna 781

Slip Activity of Persistent Slip Bands in early Stages of Fatigue Life of Austenitic 316L Steel

J. Man, A. Weidner, P. Klapetek and J. Polák 785

Propagation of Fatigue Cracks in Notched Specimens of EN AW 7475-T761

J. Bär and G. Wilhelm 789

Trajectory and Crystallography of Crack Growth in Austenitic Steel after LCF Tests

T. Eterashvili, T. Dzigrashvili and M. Vardosanidze 793

Experimental Investigation of Modes II and III Fatigue Crack Growth in Unalloyed Titanium

T. Vojtek and J. Pokluda 797

Complex Evaluation of Fatigue Tests Results of Plain C30/37 and C45/55 Class Concrete Specimens

H. Šimonová, B. Kucharczyková, I. Havlíková, S. Seitzl and Z. Keršner 801

Magnesium AZ91 Alloy Cast Mechanical Properties Measured by the Miniaturized Disc-Bend Test

B. Romelczyk-Baishya, T. Brynk, R.M. Molak, A. Jastrzębska, K. Nowak and Z. Pakiela 805

The Role of Second Phase Intermetallic Precipitates in Fatigue Fracture Mechanism for Aluminum Alloy AW 7075

G. Chruścielski and L. Korusiewicz 809