

Table of Contents

Preface and Committees

Keynotes

Alloy Design of Creep- and Oxidation-Resistant 9%Cr Steel for High Efficiency USC Power Plant F. Abe	3
Creation of Harmonic Structure Materials with Outstanding Mechanical Properties K. Ameyama and H. Fujiwara	9
On the Microstructure of Plate Steels for API-5L X120 Applications C.I. Garcia, M.J. Hua, X. Liang, P. Suikannen and A.J. DeArdo	17
Shaping of Nanostructured Materials or Coatings through Spark Plasma Sintering C. Estournès, D. Oquab, S. Selezneff, M. Boidot, D. Monceau, D. Grossin, C. Drouet, U.C. Chung, F. Roulland, C. Elissalde, M. Maglione, R. Chaim, P. Miele, J. Gurt-Santanach, G. Chevallier, A. Weibel, A. Peigney and C. Laurent	24
Development of NiMnGa/Polymer Composite Materials H. Hosoda and T. Inamura	31
Empirical Relationships for the Impact of Nb and C Content on the Mechanical Properties of Hot Rolled Microalloyed Steels K. Verbeken, S. Vervynckt, P. Thibaux and Y. Houbaert	37
Progress and Issues in Thermomechanical Simulation: Experience in Tata Steel (Europe) A.A. Howe, S.V. Parker, R. Beaverstock and W.M. van Haaften	43
Transformation of Deformed Austenite at Temperatures above the A_{e3} J.J. Jonas, V.V. Basabe and C. Ghosh	49
Strategy for Achieving High Strength in Al-Mg-Sc Alloys by Intense Plastic Straining R. Kaibyshev, A. Mogucheva and A. Dubyna	55
Orientation Relationships between Directionally Grown Precipitates and their Parent Phases in Steels D.N. Lee and H.N. Han	61
Magnesium Alloy Development for Automotive Applications A.A. Luo, R.K. Mishra, B.R. Powell and A.K. Sachdev	69
Microstructural Evolution of Ultrafine Ferrite during Plate Steel Processing Using Intermediate Cooling D.J. Hamre, D.K. Matlock and J.G. Speer	83
Hot Working Defines Thermomechanical Processing (TMP) for Aluminum Alloys and Composites H.J. McQueen and E. Evangelista	89
Equivalent CTOD Concept for Correction of CTOD Toughness for Constraint Loss in Steel Weld Components F. Minami	97
Characterization of a Biomedical Titanium Alloy Using Various Surface Modifications to Enhance its Corrosion Resistance and Biocompatibility R. Bhola and B. Mishra	105
Mechanical Spectroscopy Applications for Investigating Metallurgical Processes R. Montanari and E. Bonetti	113
Scale/Physics/Time Properties and Functions in Bioartificial Systems T.C. Bidone, M.A. Deriu, G. Falvo D'urso Labate, D. Massai, U. Morbiducci and F.M. Montevecchi	121
Hot Deformation and Dynamic Recrystallization of the Beta Phase in Titanium Alloys F. Montheillet, L. Pallot and D. Piot	127
Unusual Effect of Oxygen on the Mechanical Behavior of a β-Type Titanium Alloy Developed for Biomedical Applications M. Niinomi and M. Nakai	135

Influences of Cracking of Coated Layer on Critical Current in Coated Composite Superconductor	
S. Ochiai, H. Okuda, A. Toda, S. Nagano, M. Sugano, K. Osamua and W. Prusseit	143
New Methodology to Model Simultaneous and Sequential Reactions: Main Results and Applications	
P.R. Rios, E. Villa and S.C. de Oliveira	149
Some Aspects Regarding Microstructural Heterogeneities during Steel Processing	
J.M. Rodriguez-Ibabe, P. Uranga and B. López	157
Shape Memory Epoxy Foams: New Materials for Aerospace Applications	
L. Santo	165
Bainite Formation at Low Temperatures in High C-Si Steel and its Mechanical Behavior	
J.A. da Cruz, T.F.M. Rodrigues, V.D.C. Viana and D.B. Santos	173
Influence of Alloying Elements on the Hall-Petch Coefficient in Ferritic Steel	
S. Takaki	181
DC Casting, Deformation and Strengthening of Al-Si Alloys	
L. Zuo and F.X. Yu	186
Friction Stir Processing (FSP) of Cast Metals: Processing - Microstructure - Property Relationships	
T.R. McNelley and E. Sarath Menon	194

Chapter 1: Aerospace Structural Metallic Materials/Ti Alloys

Effect of Wall Thickness Transitions on Texture and Grain Structure in Additive Layer Manufacture (ALM) of Ti-6Al-4V	
A.A. Antonysamy, P.B. Prangnell and J. Meyer	205
Linear Friction Welding of a Forged Near-α Titanium Alloy	
E. Dalgaard, P. Wanjara, J. Gholipour and J.J. Jonas	211
Sintering Performance and Mechanical Properties of Titanium Compacts Prepared by Spark Plasma Sintering	
H. Izui and G. Kikuchi	217
Mechanical Properties and Wear Resistances of TiC or B₄C Reinforced Ti-6Al-4V Prepared by Spark Plasma Sintering	
A. Ota, H. Egawa and H. Izui	222
Surface Finish Issues after Direct Metal Deposition	
P. Peyre, M. Gharbi, C. Gorny, M. Carin, S. Morville, D. Carron, P. Le Masson, T. Malot and R. Fabbro	228
Mesoscopic Modeling of Discontinuous Dynamic Recrystallization: Steady-State Grain Size Distributions	
D. Piot, G. Damamme and F. Montheillet	234
Improved Performance in Aerospace Structures with Ti and Ni Metal Matrix Composites	
C. Testani and M. Tului	240
High Temperature Characteristics of Unidirectionally Solidified Al₂O₃/GAP Eutectic Composites with a Novel Microstructure	
Y. Waku, H. Ohtsubo, N. Nakagawa and H. Yasuda	246
Determination of the Mechanism of Restoration in Subtransus Hot Deformation of Ti-6Al-4V	
F. Warchomicka, C. Poletti, M. Stockinger and H.P. Degischer	252
Powder Processing and Coating Heat Treatment on Cold Sprayed Ti-6Al-4V Alloy	
W. Wong, E. Irissou, J.G. Legoux, P. Vo and S. Yue	258
Microstructure and Mechanical Properties of Spray-Deposited Zn-30Al-1Cu Alloy	
F. Wang, B.Q. Xiong, Y.A. Zhang, H.W. Liu, Z.H. Li and X.W. Li	264

Chapter 2: Aluminium Alloys

Obtention of an Al-Based Composite Material by Direct Fusion of Used Beverage Cans	
C. Carrasco, C. Montalba and C. Camurri	271

Simulation of Hot Rolling Processing of an Al-Cu-Mg Alloy by Torsion Tests F. Carreño, C.M. Cepeda-Jiménez, F. Peñalba, M. Carsí and O. Ruano	277
Hardening of Al-Mg-Si Alloys and Effect of Particle Structure S. Gulbrandsen-Dahl, C.D. Marioara, K.O. Pedersen and K. Marthinsen	283
Modeling of Heat Treatment of Randomly Distributed Loads in Multi-Zone Continuous Furnaces A.A. Hassan and M.S. Hamed	289
Effect of Strain Rate on Hydrogen Evolution during Deformation in Al-Zn-Mg Alloys K. Horikawa, H. Yamada, M. Mutsuo and H. Kobayashi	295
Effect of Rapid Solidification on Microstructural Features of Al-Cr Alloys I.I. Tashlykova-Bushkevich and G. Itoh	301
Effect of Heat Treatments and Small Addition of Fe on the Occurrence of Serration in Al-Zn Alloys T. Kanadani, K. Nakagawa, A. Sakakibara, K. Murakami and M. Hino	305
Effect of Copper Variation and Thermomechanical Treatment on Microstructure and Properties in Aluminum Alloy Fin Stock for Heat Exchanger S.B. Kang, D.B. Kim and J.H. Cho	311
Precipitation in Al-Alloy 6016 – The Role of Excess Vacancies A. Falahati, P. Lang and E. Kozeschnik	317
Through Process Microchemistry Effects on the Properties of 8xxx Sheet W. Schneider, G. Laptjeva, M. Lentz and K.F. Karhausen	323
The Effect of Erbium on the Properties and Microstructure of Al Alloys Z. Nie, H. Huang, K.Y. Gao, B.L. Li, W. Wang, Z.Y. Chen, L. Rong, S.P. Wen, H.M. Li and T.Y. Zuo	329
Microstructure and Properties of an Al-7.5Zn-1.5Mg-1.4Cu-0.12Zr Alloy Forging X.W. Li, B.Q. Xiong, Y.A. Zhang, Z.H. Li, J.H. You, X.H. Yin, Y.Q. Fan and B.H. Zhu	335
Research on Multi-Artificial Aging Applied to Aluminum Alloy 7150 Plate Z.H. Li, B.Q. Xiong, Y.A. Zhang, X.Y. Lu, Z.B. He, L.B. Jin, X.W. Li and X.L. Han	340
Investigation on Quench Sensitivity of a Heat-Resistant Aluminum Alloy X.Y. Lu, Z.H. Li, G.J. Wang, Y.A. Zhang and B.Q. Xiong	346
Combined Effect of Deformation and Precipitation on Tensile Properties of an Al-Mg-Si Alloy M. Kolar, K. Teichmann, S. Gulbrandsen-Dahl, K.O. Pedersen and K. Marthinsen	351
Effect of Additional Elements (Cu, Ag) on Precipitation in 6xxx (Al-Mg-Si) Alloys K. Matsuda, J. Nakamura, T. Kawabata, S. Ikeno, T. Sato, C.D. Marioara, S.J. Andersen and R. Holmestad	357
Effect of the Thermomechanical Processing on Microstructure and Properties of an Al-Ce Alloy A. Mogucheva, D. Zyabkin and R. Kaibyshev	361
Producing Aluminum Foam Sandwich Panel by Melt Drag Process S. Nishida, H. Tanaka, M. Adachi and M. Motomura	367
Combined Method of Electric Contact Heating and Diffusion Connection of Steel-Aluminum D. Nozadze and D. Macharadze	373
Effects of Pre-Aging on Bendability of an Asymmetric-Rolled Al-Mg-Si Alloy T. Ogura, A. Hirose and T. Sato	377
Research on the Mechanical Properties of Al6061 Intermetallic Compounds Solubility as Manufactured by Spray Casting M. Ryou, S.Y. Baek and M.H. Kim	383
Particle Stimulated Nucleation in Severely Deformed Aluminum Alloys J.J. Sidor, K. Decroos, R.H. Petrov and L.A.I. Kestens	389
Superplastic Behaviour of AA5083 Aluminium Alloy with Scandium and Zirconium A. Smolej, B. Skaza, B. Markoli, D. Klobčar, V. Dragojević and E. Slaček	395
Development of Grain Refinement in Aluminium Field B.D. Sun, Y.F. Han and J. Wang	402
Effect of Liquid Hot Isostatic Pressing on Structure and Mechanical Properties of Aluminum Gravity Die Castings E. Ivanova, D. Tagirov and R. Kaibyshev	408

Effect of Cold Deformation on the Paint-Baking Response of Al-Mg-Si Alloy Sheet for Automotive Body	
N. Tian, L. Pan, C.C. Liu, J.J. Wang, G. Zhao, L. Zuo and C.M. Liu	414
Manufacturing Slurry and Rheocasting of Hypereutectic Al-Si-Cu-Mg Alloy	
Y. Uetani, N. Mori, M. Dohi, K. Matsuda and S. Ikeno	420
Effects of Microstructures on Fatigue Behavior of an Al-Mg-Sc Alloy at an Elevated Temperature	
C. Watanabe and R. Monzen	426
Investigation of Quench Sensitivity of an Al-7.5Zn-1.7Mg-1.4Cu-0.12Zr Alloy	
B.Q. Xiong, X.W. Li, Y.A. Zhang, Z.H. Li, B.H. Zhu, F. Wang and H.W. Liu	431
Deformability of Eutectic Al-Si Alloys Produced by Semi-Continuously DC Casting during Hot-Rolling	
T. Hong, G. Zhao, N. Tian, F.X. Yu and L. Zuo	436

Chapter 3: Biomaterials

Coatings of Ti and TiO₂ with Defined Roughness for Implants by Gas Flow Sputtering	
U. Lembke, A. Körtge, H.G. Neumann, K. Ortner, T. Jung, R. Lange and U. Beck	443
The Effect of Mechanical Constraints on Gelatin Samples under Pulsatile Flux	
E. Blangino, M.A. Cagnoli, R.M. Irastorza and F. Vericat	449
Mechanical Properties of Thermomechanically-Processed Metastable Beta Ti-Nb-Zr Alloys for Biomedical Applications	
V. Brailovski, S. Prokoshkin, K. Inaekyan, S. Dubinskiy and M. Gauthier	455
Development of a Collagen/Clay Nanocomposite Biomaterial	
A. Reyna-Valencia, P. Chevallier and D. Mantovani	461
Applications of Ceramic Nanoparticles in Nanomedicine	
G. Ciofani, S. Danti, L. Ricotti, D. D'Alessandro, S. Moscato, A. Menciasci and V. Mattoli	467
Dynamic Recrystallization of Biomedical Co-Cr-W-Ni (L-605) Alloy	
J. Favre, A. Chiba, Y. Koizumi, D. Fabrègue and É. Maire	472
Electrochemical Assessment of Cu-PIII Treated Titanium Samples for Antimicrobial Surfaces	
B. Finke, M. Polak, F. Hempel, K. Schroeder, G. Lukowski, W.D. Müller and K.D. Weltmann	478
Evaluation of Bone Quality in Mandible of Young M-CSF Deficient-Induced Osteopetrotic Mouse	
W. Fujitani, J.W. Lee and T. Nakano	484
Effect of Energy Density of Incident Beam on Mechanical Property of Titanium Alloy Products Fabricated by Electron Beam Melting (EBM) Method	
H. Fukuda, H. Takahashi, K. Kuramoto and T. Nakano	488
How Oxygen Influences the Deformation Mechanism of the “Gum Metal” Titanium Alloy Composition	
T. Gloriant, M. Besse, P. Castany, M. Cornen, D.M. Gordin and D. Laillé	492
Preparation of HA-Coated Mg-4.0Zn-1.0Ca-0.6Zr(wt%) Alloy and its Biodegradation Behaviors	
H.Q. Huang, R.G. Guan, T. Zhao, Z.Y. Zhao and F.R. Cao	498
<i>In Vitro</i> Degradation of Ultrafine Grained Mg-Zn-Ca Alloy by High-Pressure Torsion in Simulated Body Fluid	
S. Guan, Z.W. Ren, J.H. Gao, Y.F. Sun, S.J. Zhu and L.G. Wang	504
Regeneration of Bone Mass and Bone Quality around Implant with Grooves for Aligning Bone Cells in Rabbit Hindlimb Bones	
T. Ishimoto, K. Kawata, T. Sakai, H. Yoshikawa and T. Nakano	510
Influence of Shape Memory Properties on Sliding Resistance in Fixed Orthodontic Appliances	
L. Jordan, P. Garrec and F. Prima	514
Influence of Hydrogen Discharged from Palladium Base Hydrogen Storage Alloys on Cancer Cells	
A. Kagawa, K. Katsura, M. Mizumoto, Y. Tagawa and Y. Masiko	520
Effect of Heat Treatments of Bioactive Nacre on HAp Formation in SBF	
S. Kobayashi, M. Ui, H. Araiawa, T. Sakamoto and K. Nakai	526

Electron Beam Melting: Moving from Macro- to Micro- and Nanoscale A. Koptioug, L.E. Rännar, M. Bäckström and R.P. Klingvall	532
Osteoconductive TiO₂ Coating on Titanium Using Anodizing in High Content Phosphoric Acid K. Kuroda, R. Ichino and M. Okido	538
Quantitative Analysis of the Cellular Actin Cytoskeleton on Geometrically Designed Surface Topography C. Matschegewski, H. Birkholz, S. Staehlke, R. Loeffler, D.P. Kern, K. Engel and B. Nebe	543
Control of Osteoblastic Cell Behavior by Surface Topography Introduced by Plastic Deformation of Ti Single Crystal with h.c.p. Structure A. Matsugaki, G. Aramoto, T. Ishimoto and T. Nakano	549
Mechanical Properties of Ti-Cr-Sn-Zr Alloys with Low Young's Modulus Y. Murayama, H. Sakashita, H. Kimura and A. Chiba	553
Young's Modulus Changeable Titanium Alloys for Orthopaedic Applications M. Nakai, M. Niinomi, X.L. Zhao and X.F. Zhao	557
Single Crystal Growth and its Microstructure in Co-Cr-Mo Alloys for Biomedical Applications T. Nakano, K. Sasaki, K. Hagihara, T. Ishimoto, Y. Fujii and A. Serizawa	561
Osteoblast Behavior <i>In Vitro</i> in Porous Calcium Phosphate Composite Scaffolds, Surface Activated with a Cell Adhesive Plasma Polymer Layer B. Nebe, M. Cornelsen, A. Quade, V. Weissmann, F. Kunz, S. Ofe, K. Schroeder, B. Finke, H. Seitz and C. Bergemann	566
Collagen-Silk Fibroin Fibers: A Promising Scaffold for Vascular Tissue Engineering E. Paternotte, M. Agostini de Moraes, M.M. Beppu and D. Mantovani	572
High Performance Beta Titanium Alloys as a New Material Perspective for Cardiovascular Applications F. Prima, F. Sun, P. Vermaut, T. Gloriant, D. Mantovani and P.J. Jacques	578
Reconstituted Extracellular Matrix Improve Osteoblastic Differentiation onto Titanium Surfaces L. Rimondini, F. Demarosi, I. Foltran and N. Quirici	584
Synthesis and Characterization of Hydroxyapatite-Based Nanostructures: Nanoparticles, Nanoplates, Nanofibers and Nanoribbons E.M. Rivera-Muñoz, R. Velázquez-Castillo, R. Huirache-Acuña, J.L. Cabrera-Torres and J. Arenas-Alatorre	589
Collagen Based Materials for Biomedical Applications: Preparation and Properties A. Sionkowska	595
The Analysis of Hip Joint Prosthesis Head Microstructure Changes during Variable Stress State as a Result of Human Motor Activity A. Szarek, G. Stradomski and J. Włodarski	600
Corrosion Behavior and Surface Analysis of Melt-Spun Mg-Based Metallic Glass in Physiological Saline Solution Y.S. Wang, M.J. Tan and A.W.E. Jarfors	606
Anodic Oxide Coatings on Ti Alloys and their Osteoconductivity D. Yamamoto, K. Kuroda, R. Ichino and M. Okido	612
Electrophoretic Deposition of Organic - Inorganic Composites for Biomedical Applications R. Ma and I. Zhitomirsky	617

Chapter 4: Composites

Effect of Heat Treatment on Tensile Strength, Hardness and Thermal Conductivity of Blended Polymer Composite N. Alallak	625
Mechanical Behavior of High Boron Content Al-B₄C Metal Matrix Composites at Elevated Temperatures X.-. Chen, L. St-Georges and M. Roux	631
Fabrication of Injection Moulded 304L Stainless Steels Reinforced with Tungsten Carbide Particles N. Chuankrerkkul and P. Chakartnarodom	638

Composite 316L+Al₂O₃ for Application in Medicine A. Dudek and R. Włodarczyk	643
Evaluation of Cutting Process on the Tensile and Fatigue Strength of CFRP Composites Y. Harada, K. Kawai, T. Suzuki and T. Teramoto	649
Investigating the Potential of TiB₂-Based Composites with Ti and Fe Additives as Wettable Cathode H. Heidari, H. Alamdari, D. Dubé and R. Schulz	655
Fabrication of Metal-Based Functionally Graded Grinding Wheel by a Centrifugal Mixed-Powder Method E. Miura-Fujiwara, H. Sato, M. Yamada and Y. Watanabe	661
Microstructure and Superconductive Property of MgB₂/Al Composite Materials M. Mizutani, D. Tokai, K. Matsuda, K. Nishimura, T. Kawabata, Y. Hishinuma and S. Aoyama	667
Degradation Mechanism of Polycrystalline Silicon Carbide Fiber due to Air-Exposure at High Temperatures K. Morishita, S. Ochiai, H. Okuda, T. Ishikawa and M. Sato	671
Microstructure of the New Route Wire Fabrication of V₃Ga Compound Superconducting Wire Using High Ga Content Cu-Ga/V Precursor Composite Material S. Murakami, M. Mizutani, K. Matsuda, K. Nishimura, T. Kawabata and Y. Hishinuma	677
Forming Potential of Steel/Polymer/Steel Sandwich Composites with Local Plate Inserts H. Palkowski, O. Sokolova and A. Carradò	681
Mechanical Properties, Aging Behavior and Microstructure Evolution of Mg-Nd-Zn-Zr Based Magnesium Matrix Composite Reinforced with Alumina Fibers L.M. Peng, B. Hu and W.J. Ding	687
Functionally Graded Biocomposites M.R. Barzegari and D. Rodrigue	693
Fabrication of Vapor Grown Carbon Fiber Reinforced Aluminum Composites by Spark Sintering G. Sasaki, Z.F. Xu, Y.B. Choi, K. Sugio and K. Mastugi	699
Microstructure and Compression Behavior of Cenosphere Filled Aluminum Syntactic Foams Q. Zhang and G. Wu	704

Chapter 5: Dynamic Behaviour of Materials

Fabrication of Bulk Functionally-Graded Syntactic Foams for Impact Energy Absorption T. Adachi and M. Higuchi	711
Nanofragmentation Controlled by a Shock-Induced Phase Transition in Mullite Related Ceramics and its Application T. Atou, N. Kawai, K. Yubuta, S. Ito and M. Kikuchi	717
Comparison of Experimental and Numerical Results for the Quasi-Static and Dynamic Tensile Behaviour of a Commercial Ti6Al4V Alloy as a Function of Initial Crystallographic Texture F. Coghe, W. Tirry, J. Peirs, P. Verleysen, E. Dalgaard, P. Wanjara, L. Rabet and P. van Houtte	723
Controlling of Distribution of Mechanical Properties in Functionally-Graded Syntactic Foams for Impact Energy Absorption M. Higuchi, T. Adachi, Y. Yokochi and K. Fujimoto	729
Explosive Welding of Molybdenum/Copper Using Underwater Shock Wave P. Manikandan, J.N. Lee, A. Mori and K. Hokamoto	735
Phase Transformation of Powdered Material by Using Metal Jet A. Kira, R. Tomoshige, K. Hokamoto and M. Fujita	741
Dynamic and Quasi-Static Compression Tests for Polylactic Acid Resin Foam H. Kobayashi, K. Horikawa, K. Watanabe, K. Ogawa and K. Nozaki	745
Formation of Whisker in Pure Sn under Tensile Stress and a Method of its Suppression K. Nakai, T. Sakamoto, T. Miyamoto and S. Kobayashi	751
Transition Joints of Aluminum and Magnesium Alloy Made by Underwater Explosive Welding Technique P. Manikandan, J.N. Lee, K. Mizumachi, S.H. Ghaderi, A. Mori and K. Hokamoto	757

Underwater Explosive Welding Using Detonating Code A. Mori, A. Fukushima, K. Shiramoto and M. Fujita	763
Effect of Temperature on Crater Formation and Ejecta Composition in Aluminum Alloy Targets M. Nishida, K. Hayashi, J. Nakagawa and Y. Ito	768
High Strain Rate Torsion and Bauschinger Tests on Ti6Al4V J. Peirs, P. Verleysen, K. Verbeken, F. Coghe and J. Degrieck	774
Dynamic Tensile Properties of Magnesium Nanocomposite Y.B. Guo, V.P.W. Shim and B.W.F. Tan	780
Response of Silica-Nylon6 Nanocomposites to Static and Dynamic Loading V.P.W. Shim, Y.B. Guo, H.W. Gu and X. Li	786
Hot Dynamic Densification of Materials by Utilizing Underwater Shock Wave R. Tomoshige, S. Ii, M. Fujita and A. Chiba	793
Impact Compressive Failure of a Unidirectional Carbon/Epoxy Laminated Composite in Three Principal Material Directions T. Yokoyama	799
Effect of Random Defects on Dynamic Response of Honeycomb Structures Z.J. Zheng and J.L. Yu	805

Chapter 6: Energy Materials

Sintered Lamellar Soft Magnetic Composites: Shaping and Magnetic Properties F. Bernier, P. Lemieux, M. Isac, R.I.L. Guthrie and Y. Thomas	813
Centrifugal Separation of Primary Silicon during Solidification in Al-Si Alloy for Solar Silicon Feedstock J.Y. Cho, B.H. Kang and K.Y. Kim	819
Atomic Resolution Investigations of Phase Transformation from TaN to CrTaN in a Steel Matrix H.K. Danielsen and J. Hald	823
Influence of Laser Processing on Polycrystalline Silicon Surface L.A. Dobrzański and A. Drygała	829
Microstructural Investigation on Tungsten for Applications in Future Nuclear Fusion Reactors P. Deodati, R. Donnini, R. Montanari and N. Ucciardello	835
Effect of Tempering on Mechanical Properties and Microstructure of a 9% Cr Heat Resistant Steel V. Dudko, A. Belyakov and R. Kaibyshev	841
Effect of Boron on Microstructure and Impact Toughness of a 10%Cr Martensitic Steel N. Dudova and R. Kaibyshev	847
A Differential Scanning Calorimetry (DSC) Study of Phase Changes in an As-Received Zr-2.5Nb Pressure Tube Material during Continuous Heating and Cooling R.W.L. Fong, H. Saari, R. Miller, J. Teutsch and S.C. Vogel	853
Fast Melting and Refining of Recycled Silicon Powders from the Wafer Back Grinding Process for Solar Cell Feedstock K.H. Seo, B.H. Kang and K.Y. Kim	859
Evolution of Intermetallic Phase Fe₂(W, Mo) in 9% Cr Steel during Creep Rupture Tests at 650°C A. Korneev, D.S. Zmienko, A.S. Gudenko, P.A. Kozlov and A.E. Korneev	865
Accelerated Microstructure Transformation Caused by Thermal-Mechanical Fatigue S.T. Mandziej	871
Structural Changes of Liquid Pb-Bi Eutectic Alloy P. Deodati, F. Gauzzi, R. Montanari and A. Varone	878
Pulsed Laser Deposition of Pseudocapacitive Metal Oxide Thin Films for Supercapacitor Applications D.F. Yang	884
Study of Modified Layer on Exterior Surface of Superheater Tubes D. Zmienko, A. Korneev and V. Bogachev	890

Chapter 7: Fracture and Mechanical Behaviour

Influence of the Impurities on Cathodic Copper on the Ductility of Copper Wires C. Camurri, C. Carrasco, A. Pagliero and R. Leite	899
Fracture Resistance in GFRP-BMC Composites Induced by Sub-Millimeter Length Fiber Dispersion M.C. Faudree and Y. Nishi	907
Brittle Crack Propagation/Arrest Behavior in T-Joint Structure of Heavy Gauge Steel Plates T. Handa, K. Nishimura, H. Shiomi and S. Tsuyama	914
Low Velocity Surface Fracture Patterns in Brittle Material: A Newly Evidenced Mechanical Instability M.L. Hattali, J. Barés, L. Ponson and D. Bonamy	920
Influence of Microstructure on Damage in Advanced High Strength Steels F. Hisker, R. Thiessen and T. Heller	925
Effect of Die Temperature on Tensile Property of Rheocast Phosphor Bronze T. Kose, Y. Uetani, K. Nakajima, K. Matsuda and S. Ikeno	931
Effect of Pulsed Electric Current Treatment on the Corrosion and Strength of Reinforcing Steel L. Kruszka, A. Babutsky, A. Chrysanthou and C.E. Tan	937
Intergranular Cracking in Alloy 690 with Nb, Mo, and Hf Additions: <i>In Situ</i> SEM High Temperature Deformation Study J.S. Unfried and A.J. Ramirez	945
Effects of Cleavage Triggers and Constraint on Brittle Fracture in Steel Weld Heat Affected Zone Y. Shimada, Y. Kayamori, T. Inoue and T. Tagawa	951

Chapter 8: Friction Stir Processing Welding

Quality of Interfaces in Cu/Al Dissimilar Friction-Stirred Welds M.N. Avettand-Fènoël, R. Taillard and G. Ji	959
Effect of Processing Parameters on Superplastic and Corrosion Behavior of Aluminum Alloy Friction Stir Processed A. Burgueño, H.G. Svoboda and H. Svoboda	965
Tensile Fracture Behavior of Friction Stir Processed Al-7Si-0.3Mg Cast Alloy Z. Chen, F. Abraham and J. Walker	971
Phenomena Leading to a Modification of the Nano-Sized Structure during Resistance Upset Welding of ODS Steel Cladding F. Corpacci, A. Monnier, A. Poulon Quintin and J.P. Manaud	977
Material Flow in Aluminum Friction Stir Welds R.W. Fonda, A.P. Reynolds, C.R. Feng, K.E. Knipling and D.J. Rowenhorst	983
Microstructure and Mechanical Properties of FSWed Aluminum Extrusion with Bobbin Tools K. Okamoto, A. Sato, S.H.C. Park and S. Hirano	990
Friction-Stir Welding of High-Softening-Temperature Materials Using Cobalt-Based Alloy Tool S.H.C. Park, S. Hirano, S. Imano, Y.S. Sato, H. Kokawa, T. Omori and K. Ishida	996
Fine and Ultra-Fine Grained AZ61 and AZ91 Magnesium Alloys Obtained by Friction Stir Processing P. Rey, D. Gestó, J.A. del Valle, D. Verdera and O. Ruano	1002
Microstructural Modelling for Friction Stir Welding of High Strength Aluminum Alloys J.D. Robson and L. Campbell	1008
Finite Element Simulation of the Mechanical Behaviour of Multifilamentary MMC during Wire Drawing R. Taillard and A. Rabhi	1014

Chapter 9: Fuel Cells and Hydrogen Storage Technologies and Batteries

A New Method for Preparing Electrospinning-Derived Carbon Nanofiber Webs with Electrodeposited Sn-Sb Alloy as an Anode Material of Lithium Ion Batteries A.R. Saatchi, E. Ghanbari, A. Saatchi, K. Raeissi, H. Tavanai and S. Mirza Khanlouei	1023
Amorphous Silicon-Coated Carbon Nanofibers Composite as Anode Material for Lithium-Ion Batteries E. Ghanbari, A.R. Saatchi, K. Raeissi, A. Saatchi and H. Tavanai	1029
Tape Casting as a Multi Purpose Shaping Technology for Different Applications in Energy Issues W. Schafbauer, F. Schulze-Küppers, S. Baumann, W.A. Meulenberg, N.H. Menzler, H.P. Buchkremer and D. Stöver	1035
Development of Lean Alloyed Austenitic Stainless Steels with Reduced Tendency to Hydrogen Environment Embrittlement S. Weber, M. Martin and W. Theisen	1041
Sintered Stainless Steel for Interconnectors for PEM Fuel Cell R. Włodarczyk	1047
Catalytic Properties of Ni₃Fe Foil for Hydrogen Production from Methanol Y. Xu, M. Demura, T. Hirano, Y. Kaneno and T. Takasugi	1052

Chapter 10: Intermetallics

Optimization of the Fluorine Effect for Improving the Oxidation Resistance of TiAl-Alloys A. Donchev, M. Schütze, A. Kolitsch and R. Yankov	1061
High-Temperature Tensile Properties of Ti-Al-X (X=Cr,W) Consisting of α_2, β and γ in Three Phases K. Hashimoto	1066
Surface Effects on the Mechanical Properties of Gamma Titanium Aluminides J. Lindemann, M. Glavatskikh and C. Leyens	1071
Deformation Microstructures of Two-Phase Intermetallic Alloy Composed of Ni₃Al and Ni₃V in Single Crystalline Form T. Moronaga, Y. Kaneno, H. Tsuda and T. Takasugi	1077
Friction and Wear Properties of Fe₇Mo₆-Based Alloy under Various Sliding Conditions T. Murakami and K. Matsuzaki	1083
Microstructural Refinement of Boron Containing β-Solidifying γ-Titanium Aluminide Alloys M. Oehring, A. Stark, J.D.H. Paul, T. Lippmann and F. Pyczak	1089
Density Functional Theory and <i>Ab Initio</i> Molecular Dynamics Study of the Effect of Ti and Zr Transition Metals in D0₃ Fe₃Al S. Chentouf, J.M. Raulot, H. Aourag and T. Grosdidier	1095
The Microstructure, Creep, and Hardness Properties of Powder Metallurgy Beta Gamma TiAl-4Nb-3Mn Alloy T. Sawatzky, D.Y. Seo, H. Saari, D. Laurin and Y.W. Kim	1100
First Principles Investigation of Interaction of Oxygen with Low Index Surfaces of γ-TiAl Y. Song, J.H. Dai and R. Yang	1106

Chapter 11: Magnesium Alloys

The Effect of EMS on the Microstructure of LPSO Mg-Zn-Y Cast Alloy H. Akiyama and Y. Kawamura	1117
Plastic Deformation Behavior in Magnesium Alloy Single Crystals S. Ando, M. Tsushida and H. Kitahara	1122
High Temperature Deformation and Associated 3D Characterisation of Damage in Magnesium Alloys P. Lhuissier, A. Villanueva Fernandez, L. Salvo and J.J. Blandin	1128

Ternary Intermetallic Compounds across the Mg-NiY Line at 673 K M. Mezbahul-Islam, D. Kevorkov, E. Essadiqi and M. Medraj	1134
Intragranular and Grain Boundary Precipitations with Aging Treatment in Mg-Al System Alloys Poured into Gravity Mold M. Furui, S. Ikeno and S. Saikawa	1140
Microstructure Evolution of AS21 Magnesium Alloy via the SIMA Process M.B. Karimi, M.H. Heidary, J. Samei and D.E. Green	1146
Roll Casting of Clad Strip T. Haga, R. Nakamura, S. Kumai and H. Watari	1152
Microstructural Factors Affecting the Deformation Behavior of Mg₁₂ZnY LPSO-Phase Alloys K. Hagihara, A. Kinoshita, Y. Fukusumi, M. Yamasaki and Y. Kawamura	1158
Formability of Magnesium-Lithium Alloy Sheet by Multi-Stage Deep Drawing Y. Harada, A. Yamamoto, T. Goto and E. Nakamura	1164
Experimental Study on Phase Diagram in the Vicinity of X or W Phase in the Mg-Zn-Y Ternary System T. Horiuchi, H. Ikee, A. Hamaya, S. Minamoto, S. Nomoto and S. Miura	1170
Deformation Behavior of Mg-Ni-Y Alloy with Long Period Stacking Ordered Phase T. Itoi, R. Ichikawa and M. Hirohashi	1176
Control of the Nugget Nanostructure of Mg₉₆Zn₂Y₂ Welded by Resistance Spot Welding C. Iwamoto, S. Satonaka and Y. Kawamura	1181
Microstructure and Mechanical Properties of Mg₉₆Zn₂Y₂ Joints Welded by Resistance Spot Welding C. Iwamoto, S. Satonaka and Y. Kawamura	1187
Dynamic Strain Aging Behavior of a Mg-Ce Alloy and its Implications for Extrusion L. Jiang, J.J. Jonas and R.K. Mishra	1193
Microstructure and Mechanical Properties of Extruded Mg-Zn-Ce-Zr Alloy Rods L. Jin, G. Li, J. Dong and W.J. Ding	1199
HRTEM Observation of Precipitates in Mg-Gd-Zr and Mg-Y-Zr Alloys Aged at 423 K T. Kawabata, K. Matsuda and S. Ikeno	1205
Improving Corrosion Resistance of MRI 230D Mg Alloy by Hybrid Coating of Laser Surface Alloying and Plasma Electrolytic Oxidation G. Rapheal, S. Kumar, C. Blawert and N.B. Dahotre	1209
A Differential Scanning Calorimetric Study of the Mg-Cu-Y System M. Mezbahul-Islam, E. Essadiqi and M. Medraj	1215
C Fibres - Mg Matrix Composites Produced by Squeeze Casting and Friction Stir Processing: Microstructure & Mechanical Behaviour A. Mertens, A. Simar and F. Delannay	1221
Improvement in Mechanical Properties of Coarse-Grained AZ61 Mg Alloy by Multidirectional Forging and Ultrafine Grain Refinement H. Miura and M. Ito	1227
Effect of Grain Size on Fatigue Crack Propagation in Extruded AZ31 Magnesium Alloys S. Morita, N. Ohno, F. Tamai and Y. Kawakami	1233
Effect of Long-Period Stacking Order Phase and α-Mg Phase on Strength and Ductility of Mg-Zn-Y Alloy M. Noda and Y. Kawamura	1237
Microstructure of the High-Strength Magnesium Alloy on Cylinder Upsetting L.Q. Ruan, M. Noda, Y. Marumo and Y. Kawamura	1243
Creep Behavior and Microstructures in Grain Boundary Strengthened Mg-Al-Ca Thixomolded® Alloys M. Suzuki, A. Shibata and K. Maruyama	1249
Evolution of Texture and Microstructure of AZ31 Mg Alloy Sheet at High Strain Rates I. Ulacia, N.V. Dudamell, J.A. Esnaola, S.B. Yi, M.T. Perez-Prado, F. Galvez, D. Letzig and I. Hurtado	1255
Microstructure and Mechanical Properties of Magnesium Alloy Prepared by Repetitive Upsetting W. Guo, Q.D. Wang, M.P. Liu, X.T. Liu and H. Zhou	1261
Grain Refinement of Mg-Al-Zn Alloy Bar during Hot Compression A. Watazu, M. Hakamada, H. Iwasaki, I. Shigematsu and N. Saito	1267

Process-Structure-Property Relationships for Magnesium Alloys J.P. Weiler, J.T. Wood and I. Basu	1273
Effect of Process Variables on Microstructural Features during Solidification of AM60B Magnesium Alloy I. Basu, J.T. Wood and J.P. Weiler	1279
Evolution of Precipitated Phases during Ageing in High Alloyed Mg-Al Based Alloys I. Yakubtsov and M. Niewczas	1285
Microstructural Evolution during Recrystallization of Magnesium Alloys S.B. Yi, J. Bohlen, S. Sandlöbes, S. Zaefferer, D. Letzig and K.U. Kainer	1291
Effect of Cold Deformation on Microstructure and Mechanical Properties of Mg-8Gd-3Y-0.5Zr Alloy D.J. Li, X.Q. Zeng, X. Su, Y.C. Xie and W.J. Ding	1297

Chapter 12: Metallic Glasses & Their Processing Bulk Metallic Amorphous Materials

Elastic Constants, Equation of State and Mechanical Relaxations of some Metallic Glasses at High Pressure M. Aniya	1305
Non-Isothermal Crystallization Kinetics of $\text{Co}_{67}\text{Fe}_4\text{Cr}_7\text{Si}_8\text{B}_{14}$ Amorphous Alloy S.A. Hasheminezhad, M. Haddad-Sabzevar and S. Sahebian	1311
Pressure Sensitivity of Plasticity in Metallic Glasses below Glass Transition: A Literature Review V. Keryvin, J.S. Brest, P. Longere and A. Anguet	1318
Manufacture and Industrial Application of Fe-Based Metallic Glasses S.W. Kim, J. Namkung and O. Kwon	1324
Effect of Inhomogeneity of Zr-Based Bulk Metallic Glass Plate on Fatigue Strength under Torsion Y. Nakai, K. Nakagawa and K. Mikami	1331
Molecular Dynamics Simulations Based on Plastic Crystal Model with Introducing United Atom Scheme Demonstrated for Zr_2Ni Metallic Glass A. Takeuchi and A. Inoue	1337
Development of Cu-Clad Metallic Glass for Soldering T. Terajima	1343
Precipitation in Zr-Based Ternary Alloys during Quenching T. Yamamoto, Y. Yokoyama and A. Inoue	1348

Chapter 13: Modelling & Simulation

Homogeneous Abnormal Grain Growth in Polycrystalline Materials G.C. Abbruzzese and C. Forzanti	1355
Flow Curve Modelling of an Austenitic Stainless Steel at High Temperatures Starting from the One-Parameter Model of Strain Hardening G. Angella	1361
Interface Motion and Interface Mobility of the Partitioning Phase Transformations in Fe-Mn-C and Fe-C Alloys: A Cyclic Phase Transformation Approach H. Chen, B. Appolaire and S. van der Zwaag	1367
An Analytical Technique for Optimization of Mechanical Performance of Foam Core Sandwich Structures H. Montazeri, F. Azarmi, T.W. Coyle and J. Mostaghimi	1373
Mathematical Modeling of Behaviour a Liquid Steel Flow and a Non-Metallic Inclusions in the One Strand Wedge Type Tundish with a Subflux Turbulence Controller and a Low Dam A. Cwudziński and J. Jowsa	1379
Numerical Modeling of Nonmetallic Inclusions Flowing Out during Solidification of Continuous Cast Steel Billets in Mould Zone W. Derda and I. Staniewski	1385

Hydrogen Charging of High Strength Steel Specimens and Physical Simulation of Cold Cracking under Laser Beam Welding Conditions O. Dreibati, R. Ossenbrink and V. Michailov	1391
The Influence of the Initial State on the Softening and Precipitation Kinetics in Hot Metal Forming P. Hagemann, R. Kawalla, G. Korpala and M. Schmidtchen	1397
Predicting Solid-State Phase Transformations during Welding of Ferritic Steels C.J. Hamelin, O. Muránsky, P. Bendeich, K. Short and L. Edwards	1403
Determining the No-Recrystallization Conditions for Industrial Hot Strip Rolling of Steels Using Laboratory Simulations G. Herman and E.I. Poliak	1409
Effect of Water Temperature on Wetting Front Kinematics during Forced Convective Quenching B. Hernández-Morales, J.R. González-López, G. Solorio-Díaz and H.J. Vergara-Hernández	1415
Modelling of Strip Shape and Profile during Cold Rolling of Ultra Thin Strip Z.Y. Jiang, X.W. Cheng, X.Z. Du, D.B. Wei and X.F. He	1421
Numerical Simulation of Solidification of Thick-Wall Stainless Steel Pipe in Horizontal Centrifugal Casting Process E.Y. Guo, Q. Zheng and T. Jing	1427
Result Mining in Numerical Simulation of Casting and Heat Treatment Processes J.W. Kang and T.Y. Huang	1433
Analysis of the Asymmetric Plate Rolling Process A. Kawalek, H. Dyja, Ł. Sołtysiak, S. Mróz and P. Szota	1438
Algorithm for Controlling Mechanical Properties of Hot Rolled Steels Using Bayesian Network Model O.S. Khlybov and I.V. Dubinin	1444
From TRB and LP Plate to Variable Gauge Rolling: Technology, Theory, Simulation and Experiment X. Liu, Z.Q. Wu, Z. Fang, G.J. Zhang and Y. Zhi	1448
Parabolic and Hyperbolic Two-Temperature Models of Microscopic Heat Transfer. Comparison of Numerical Solutions E. Majchrzak	1454
Numerical Model of Thermal Processes in Domain of Thin Film Subjected to a Cyclic External Heat Flux B. Mochnacki and M. Ciesielski	1460
Study of Transverse Crack Formation of a Nb-Peritectic Steel S. Nafisi, L. Collins and E.S. Szekeres	1466
Characterization of WELD Heat Affected Zone of ASTM A709 HPS 100W A. Biswas, P. Nash, S. Lalam and S. Jansto	1474
First-Principles Study of H₂O Adsorption on Oxygen-Covered Fe Surface N. Nunomura and S. Sunada	1481
Austenite-Bainite Transformation Kinetic Model for the Powder-Metallurgical Steel Aсталoy 85 Mo P. Nusskern, J. Hoffmeister and V. Schulze	1485
Physical and Numerical Simulation of Thermo-Mechanical Properties in the Weld Heat Affected Zone of an AlMgSi-Alloy O. Dreibati, R. Ossenbrink, N. Doynov and V. Michailov	1491
The Physical and Numerical Modeling of Heat Treatment the Experimental Complex-Phase (CP) Steel J. Rapalska, H. Dyja and B. Koczurkiewicz	1497
Modelling the Flow Behaviour of Dual-Phase Steels with Different Martensite Volume Fractions by Finite Element Method M. Marvi-Mashhadi, A. Rezaee-Bazzaz and M. Mazinani	1503
Computer Simulation of Spinodal Decomposition in Duplex Stainless Steels Y. Saito	1509
The Influence of the Impeller Shape on Hydrogen Removal from Liquid Aluminium - Physical Model M. Saternus	1515

Modeling Particle Distances of Coherent Prolate- and Oblate-Shaped Precipitates in bcc Systems	
B. Sonderegger, E. Kozeschnik and C. Sommitsch	1521
Evaluation of the Effects of Inclusion Distribution on the Local Ductility of DP Steel	
Y. Suwa, T. Matsuno, S. Hirose, N. Fujita and A. Seto	1527
3D FEM Modelling and Experimental Verification of the Rolls Wear during the Bar Rolling Process	
P. Szota, S. Mróz, H. Dyja and A. Kawałek	1533
Aluminum Hydride Clusters as Hydrogen Storage Materials and their Electronic Stress Tensor Analysis	
K. Ichikawa, Y. Ikeda, R. Terashima and A. Tachibana	1539
Atomistic Simulation of Stress-Induced Grain Boundary Diffusion: For Tin-Whisker Problem	
Y. Umeno and J. Negami	1545
Fracture Laws for Simulating Compressive Fracture in Lattice-Type Models	
J.G.M. van Mier	1550
Modeling of the Steel Flow and Non-Metallic Inclusion Separation due to Flotation in a Six-Strand cc Tundish	
M. Warzecha	1556
Ferrite Transformation Kinetics of Severely Hot-Deformed Austenite	
A. Yanagida, J.J.S. Liu and J. Yanagimoto	1562
Effect of Grain Size on the Hydrogen Diffusion Process in Steel Using Cellular Automaton Approach	
N. Yazdipour, D.P. Dunne and E.V. Pereloma	1568
The Solute Drag Model to Calculate Grain Growth Rate at High Temperatures in Carbon Steels	
Y. Yogo, K. Tanaka, H. Ikehata, N. Iwata, K. Nakanishi and T. Ishikawa	1574
Simulation and Control of Distortion of Hydro Turbine Blade Steel Casting in Heat Treatment Process	
H.L. Yu, J.W. Kang and T.Y. Huang	1580
Carbo-Nitride Precipitation in Tempered Martensite - Computer Simulation and Experiment	
S. Zamberger and E. Kozeschnik	1586
Numerical Simulation of Dynamic Strain-Induced Austenite-Ferrite Transformation and Post-Dynamic Kinetics in a Low Carbon Steel	
C.W. Zheng, D. Raabe and D.Z. Li	1592

Chapter 14: Nanostructured Materials

Size Effects and Structure-Sensitivity of Properties in Electrodeposited Nanomaterials	
U. Erb	1601
Internal Stresses in Nanocrystalline Nickel and Nickel-Iron Alloys	
J.D. Giallonardo, U. Erb, G. Palumbo, G.A. Botton and C. Andrei	1607
Crystallographic Features of the C-Type Orbital-Ordered, and Charge- and Orbital-Ordered States in the Simple Perovskite Manganite $\text{Ca}_{1-x}\text{La}_x\text{MnO}_3$	
Y. Inoue, M. Arao, D. Shiga and Y. Koyama	1612
Electrodeposited Nanocrystalline Ni-Fe with Banded Structure	
U. Klement, M. Shahabi-Navid and G.D. Hibbard	1618
Obtaining Ultrafine and Nanocrystalline Structure by Hot and Warm Deformation in Microalloyed Steel X90	
D. Ringinen, N.G. Kolbasnikov, O.G. Zotov and A. Rudskoi	1624
Nanostructured Superhydrophobic Silver Surfaces	
D.K. Sarkar	1630
Synthesis and Fabrication of Aligned Conjugated Polymer Thin Films	
T. Hirahara, M. Yoshizawa-Fujita, Y. Takeoka and M. Rikukawa	1636
Characterization of Magnetic Properties of Nanocrystalline Ni and Ni-15%Fe Alloy	
S. Arabi, G. Avramovic-Cingara, G. Palumbo, U. Erb and M. Niewczas	1642

Chapter 15: Neutron Scattering & X-Rays Studies of Advanced Materials

X-Ray Measurement of Residual Stress Distribution in Sputtered Cu Thin Films Y. Akiniwa and T. Sakaue	1649
EDXRD Setup for Real Time Observation of a Gas Tungsten Arc (GTA) Welding Process J. Altenkirch, J. Gibmeier, T. Buslaps and V. Honkimäki	1655
Effect of Coating with Hydroxyapatite on the Bonding of Bone to Implant A. Benmarouane, P. Millet, T. Buslaps, A. Lodini and V. Honkimäki	1661
Macro to Micro Stress and Strain Conversion in Porous Ceramics A.N. Levandovskiy, A.M. Efremov and G. Bruno	1667
Residual Stress Analysis of Textured Materials by X-Ray Diffraction Method S. Ejiri, T. Sasaki and Y. Hirose	1673
Rolling Contact Fatigue Type Analysis of Rolling Bearing by XRD and TEM H. Hidaka, K. Ueda and N. Mitamura	1679
Residual Strain Distribution around a Fatigue-Crack Tip Determined by Neutron Diffraction E.W. Huang, K.W. Li, S.Y. Lee, W. Woo, Y.S. Ding, L.W. Tsay and C.H. Chen	1685
Structure of Disordered Materials Studied by High-Energy X-Ray Diffraction Technique S. Kohara, K. Ohara, L. Temleitner, Y. Ohishi, A. Fujiwara and M. Takata	1690
Residual Stress Analysis of Stellite-Coated Forging Tool Steel Using Synchrotron Radiation Diffraction M.Y. Toumi, A. Benmarouane, H. Bonnefoy, T. Buslaps, A. Lodini and V. Honkimäki	1696
Time-Resolved X-Ray Diffraction Study on Solidification of Fe-B and Fe-C Eutectic Alloys A. Mizuno, J. Tamura, S. Kohara and M. Watanabe	1702
<i>In Situ</i> Gas Supply System on the Powder Diffraction Beamline I11 at Diamond Light Source J.E. Parker, J. Potter, S.P. Thompson, A.R. Lennie and C.C. Tang	1707
Ultra Fast <i>In Situ</i> X-Ray Micro-Tomography: Application to Solidification of Aluminium Alloys L. Salvo, M. Di Michiel, M. Scheel, P. Lhuissier, B. Mireux and M. Suéry	1713
Determination of Shearing Stresses (τ_{xz} and τ_{yz}) Using X-Ray Diffraction Method with Two-Dimensional Detector T. Sasaki, J. Akita, Y. Sone and Y. Kobayashi	1719
Hot Deformation of Cast and Extruded TiAl: An <i>In Situ</i> Diffraction Study T. Schmoelzer, K.D. Liss, S. Mayer, K. Yan, M. Reid, R.J. Dippenaar, M.J. Peel and H. Clemens	1725
Local Residual Stress Distribution at the Tooth Root Surface of a Broached Steel Component T. Strauss, H. Meier, J. Gibmeier, V. Schulze and A. Wanner	1731
Optimising Sintering in Metal Injection Moulding Using <i>In Situ</i> Neutron Diffraction D.J. Goossens, R.E. Whitfield and A.J. Studer	1737
Study of Fragment Behavior during Columnar-Equiaxed Transition of Hypoeutectic Alloy with Synchrotron Radiation J. Zhang, Q. Dong, Y.B. Dai, B.D. Sun and H.L. Xie	1743

Chapter 16: Severe Plastic Deformation

Simulation on Nanostructured Metals Based on Multiscale Crystal Plasticity Considering Effect of Grain Boundary Y. Aoyagi, T. Shimokawa, K. Shizawa and Y. Kaji	1751
Microstructure Evolution during the Accumulative Roll Bonding Process in Armco Iron E. Bonnot, F. Brisset, A.L. Helbert and T. Baudin	1757
Numerical Analysis in the Process of Alternate Pressing and Multiaxial Compression M. Kwapisz, M. Knapiński, H. Dyja and K.B. Laber	1763
Shear Strength Measurement of Gum Metal during High-Pressure Torsion T. Furuta, S. Kuramoto, N. Nagasako and Z. Horita	1769

Grain Refinement and Superplastic Deformation Behavior of Zn-Al Alloy K.J. Kim, G.H. Na and T.K. Ha	1775
Grain Refinement of Magnesium Alloys by CONFORM: A Continuous Severe Plastic Deformation Route? Y.L. He, F. Gao, B.Y. Song, R. Fu, G.M. Wu, J. Li and L. Jiang	1781
Experimental and Computational Studies of Competitive Precipitation Behavior Observed in Microstructures with High Dislocation Density and Ultra-Fine Grains T. Masuda, H. Shoichi, Z. Horita and K. Matsuda	1787
Enhanced Low-Temperature Impact Toughness of Ultra-Fine Grained SiCp/ZL108 Composites J.H. Jiang, A. Ma, Y. Wu, D. Song, S.H. An, W.W. Zhang, D.H. Yang and J.Q. Chen	1793
Strengthening of Alloys with Elastic Anisotropy by Severe Plastic Deformation S. Kuramoto, T. Furuta, N. Nagasako and Z. Horita	1799
Developing Hardness and Microstructural Homogeneity in High-Pressure Torsion M. Kawasaki and T.G. Langdon	1805
Equal Channel Angular Pressing of Cu-Al Bimetallic Rod N. Llorca-Isern, A.M. Escobar Romero, A. Roca and J.M. Cabrera	1811
Effect of Annealing on the Microstructure, Texture and Mechanical Properties of Severely Deformed Interstitial Free Steel S.S. Hazra, A. Gazder and E.V. Pereloma	1817
Friction Stir Processing of the Magnesium Alloy AZ61: Grain Size Refinement and Mechanical Properties J.A. del Valle, P. Rey, D. Gesto, D. Verdera and O. Ruano	1823
Ultrafine Grain Formation in Aluminum Alloys during Hot Severe Plastic Deformation T. Sakai and H. Miura	1829
Crystallographic Features of Martensite Transformed from Ultrafine Grained Austenite Fabricated by Severe Plastic Deformation A. Shibata, H. Jafarian, D. Terada and N. Tsuji	1835
Effect of Grain Boundaries on Fracture Toughness in Ultrafine-Grained Metals by Atomic-Scale Computational Experiments T. Shimokawa, M. Tanaka and K. Higashida	1841
Microstructural and Mechanical Properties of UFG Silver Subjected to Severe Plastic Deformation by ECAP G. Angella, P. Bassani, S. Farè, N. Lecis, D. Ripamonti, F. Spagnoli, A. Tuissi and M. Vedani	1847
Specific Mechanical Properties of Superplastically Formed Components and Resulting Applications for Vehicles K. Vorobyov, V. Danchenko, E. Beeh and G. Kopp	1853
Mechanical Properties of Ultrafine Grained Two-Phase Titanium Alloy Produced by “abc” Deformation S.V. Zharebtsov, S. Kostjuchenko, E.A. Kudryavtsev, S. Malysheva, M.A. Murzinova and G.A. Salishchev	1859
Ultrafine Grain Structure Evolution in AA6085 Aluminium Alloy Processed by HPT at Increased Temperature J. Zrník, L. Kraus, S. Scheriau and R. Pippan	1864

Chapter 17: Smart/Intelligent Materials & Processes

Shielding Effectiveness of CNTs/SSFs/PA6 Conductive Composites Y.F. Zhang, Y. Luo, S. Bai, M. Li and Z.Y. Jia	1873
Application of EBSD to the Crystallographic Investigation on Ni-Mn-Ga Alloys Z.B. Li, Y.D. Zhang, C. Esling, H. Yang, J.J. Wang, C.S. He, X. Zhao and L. Zuo	1879
Elaboration of Architected Materials by Spark Plasma Sintering D. Fabrègue, B. Mouawad, C. Buttay, M. Soueidan, A. Lamontagne, R. Forte, M. Perez, L. Courtois, C. Landron, É. Maire and V. Massardier-Jourdan	1885
Influence of Fe Content of Ti-Mn-Fe Alloys on Phase Constitution and Heat Treatment Behavior M. Ikeda, M. Ueda, T. Kinoshita, M. Ogawa and M. Niinomi	1893
Deformation Texture of Ti-26mol%Nb-3mol%Al β-Titanium Alloy T. Inamura, R. Shimizu, H. Hosoda and S. Miyazaki	1899

Effect of Substrate Temperature on the Shape Memory Behavior of Ti-Ni-Cu Ternary Alloy Sputtered Films	1903
S. Inoue, K. Morino, K. Yoshiki and T. Namazu	
Thermoelectric Properties and Densification Behavior of SrTiO₃/TiB₂ Composites	1909
M. Ito and N. Hasegawa	
Mechanical Properties of Hot-Pressed Compacts Made by Alumina Particle Dispersion Magnesium Powders	1915
S. Kawamori, K. Kuroda, H. Fujiwara and K. Ameyama	
Stability of Ti-Ta Base High Temperature Shape Memory Alloys	1921
H.Y. Kim, T. Kanaya, T. Fukushima, P.J.S. Bueconsejo and S. Miyazaki	
Smart Processing of Micro Photonic Crystals for Terahertz Wave Control - Freeform Fabrication by Stereolithographic Technique -	1925
S. Kirihara, N. Ohta, Y. Takinami and S. Tasakai	
A Comparative Study of Structure Formation in Thermomechanically Treated Ti-Ni and Ti-Nb-(Zr, Ta) SMA	1931
S. Prokoshkin, V. Brailovski, K. Inaekyan, A. Korotitskiy, S. Dubinskiy, M.R. Filonov and M. Petrzhik	
Application of Digital Image Correlation (DIC) on Magnetostriction of Fe-Pd Alloy	1937
J.Y. Chiue, H.P. Lin and J.C. Kuo	
Fabrication of Ti-Sn-Cr Shape Memory Alloy by PM Process and its Properties	1943
S. Ashida, H. Kyogoku and H. Hosoda	
Study on Binder System for Micro Powder Injection Molding of ZrO₂ Ceramic	1948
L. Liu, X.L. Ni, H.Q. Yin and X.H. Qu	
Dynamic Molding of Powder Particles at Room Temperature	1955
H. Miki, N. Nakayama and H. Takeishi	
Metal Injection Molding of Super Elastic Ti Alloy Materials	1961
H. Miura, H.G. Kang and K. Sagara	
Thermal Properties of Al/Diamond Composites Fabricated in Continuous Solid-Liquid Co-Existent State by SPS	1967
K. Mizuuchi, K. Inoue, Y. Agari, Y. Morisada, M. Sugioka, M. Tanaka, T. Takeuchi, J. Tani, M. Kawahara, Y. Makino and M. Ito	
Surface Modification of Cobalt Chrome Molybdenum Cast Alloy by Electron Beam Irradiation	1973
T. Nagae, S. Kakiuchi, H. Yamagishi, E. Yamaguchi, T. Yoneda and S. Tomida	
Crack-Less Wafer-Level Packaging Using Flash Heating Technique for Micro Devices	1979
T. Namazu, K. Ohtani, K. Yoshiki and S. Inoue	
Multi-Functional Metal/Ceramic Hybrid Composites for Structural Applications	1984
M. Nanko, D. Maruoka and N.D. Thuy	
Effects of Co Addition on Crystal Structure, Thermal Stability and Magnetic Properties of Ni-Mn-Ga Ferromagnetic Shape Memory Alloys from First-Principles Calculations	1990
J. Bai, J.M. Raulot, Y.D. Zhang, C. Esling, X. Zhao and L. Zuo	
Phase Transformation in Fe Alloys Induced by Surface Treatment	1996
H. Sato, T. Nishiura, E. Miura-Fujiwara and Y. Watanabe	
Development of Numerical Tool for Analysis of Microstructural Fracture Behavior in Smart & Intelligent Materials	2002
H. Serizawa, S. Tomiyama, T. Hajima and H. Murakawa	
Electrochemical Characteristics of 410 Stainless Steel Produced by MIM Process through EIS Method under SSRT Test	2008
S. Sunada, N. Nunomura and K. Majima	
Metal-Containing DLC: Toward a Smart Coating on Smart Materials	2014
T. Takagi, T. Takeno, H. Miki and Y. Luo	
The SMA: An Effective Damper in Civil Engineering that Smoothes Oscillations	2020
V. Torra, C. Auguet, G. Carreras, L. Dieng, F.C. Lovey and P. Terriault	
Training Effects on Damping Capacity in Mn-22.5mass%Cu-5mass%Ni-2mass%Fe Alloy	2026
Y. Watanabe, Y. Suga, E. Miura-Fujiwara, H. Sato and Y. Nishino	
Effect of Third Elements on Pseudoelasticity in Fe₃Ga Alloys	2032
H.Y. Yasuda, T. Furuta and T. Maruyama	

Chapter 18: Steels

Embrittlement of a High Manganese TWIP Steel in the Presence of Liquid Zinc C. Beal, X. Kleber, D. Fabrègue and M. Bouzekri	2041
The Formation of Ultrafine Ferrite and Low Temperature Bainite through Thermomechanical Processing H. Beladi, I.B. Timokhina and P. Hodgson	2047
Hot-Rolling of Advanced High-Manganese C-Mn-Si-Al Steels L.A. Dobrzański and W. Borek	2053
Effect of Varying High Frequency Induction Bending on the Longitudinal SAW Weld of API X80 Steel Pipe R.A. Silva, G.Z. Batista, L.F.G. de Souza and I.d.S. Bott	2059
Dual Phase Steel Characterization for Tube Bending and Hydroforming Applications C. Oliver, R.J. Bowers and D.E. Green	2066
Thermo-Mechanical Behaviour of Dual-Phase Steels in Various Structural Morphologies: Experiments and Modelling B. Buchmayr and T. Antretter	2072
Cooling Process for Precipitation Strengthening of Vanadium in Ferrite X.H. Cai, Z.Y. Liu and G.D. Wang	2078
Metallurgical Design of High Strength/High Toughness Steels A. di Schino and M. Guagnelli	2084
Theoretical and Experimental Analysis of the Cooling Ability of Device for the Plain Round Bars Accelerated Cooling Process K.B. Laber, H. Dyja and M. Kwapisz	2090
Mechanical Properties of Ultra Fine Particle Dispersion Strengthened Ferritic Steel Y. Funakawa	2096
Development of Reduced Rolling Process for Steel Plate X.H. Gao, H.F. Lan, L.X. Du and C.L. Qiu	2101
Modeling of the Influence of Admixing and Prealloying on the Optimisation of Compressibility and Sinter-Hardenability of Steel Powders N. Giguère and C. Blais	2107
Effect of Coiling Temperature on Kinetics of Austenite Formation in Cold Rolled Advanced High Strength Steels R.R. Mohanty and O.A. Girina	2112
Study of the Microstructure and Strain Induced Precipitation during Thermomechanical Processing of Low Carbon Microalloyed Steels M. Gómez, P. Valles and S.F. Medina	2118
Influence of Nb Microaddition on a Microstructure of Low-Alloyed Steels with Increased Manganese Content A. Grajcar and S. Lesz	2124
Influence of Chromium on the Hall-Petch Coefficient in Ferritic Steel A. Hironaka, N. Nakada, T. Tsuchiyama and S. Takaki	2130
Microstructure Evolution and Softening Processes Occurring during Annealing of Hot Deformed Ni-30Fe Austenite P. Hodgson, P. Cizek, H. Beladi and A.S. Taylor	2134
The Influence of Austenitization Temperature on the Mechanical Properties of a Prehardened Mould Steel H. Hoseiny, F.G. Caballero, D. San Martín and C. Capdevila	2140
Quality Analysis of Pig Iron Produced in One of Polish Steelworks E. Kardas	2146
Improvement of Rolling Contact Fatigue Life of Bearing Steel by Quenching and Partitioning Process K.H. Kim, J.S. Lee and D.L. Lee	2152
The Effect of Time and Temperature Variations during Isothermal Annealing on the Mechanical Properties of High Carbon Bainitic Steel B. Koczurkiewicz	2158

The Effect of Coke Quality on Blast Furnace Working A. Konstanciak	2164
Innovations in Simulation of Microstructure Developments M. Kruse, M. Schuck and A. Borowikow	2170
Influence of Temperature on Strain Induced Precipitation Kinetics in Microalloyed Steels S.F. Medina, A. Quispe and M. Gómez	2176
Low C High Mn Cold Rolled TWIP Steel: Kinetics of Isothermal Recrystallization T.M.F. Melo, É. Ribeiro, L. Dutra and D.B. Santos	2181
Fracture Behavior Transition by Change of Strain Rate in Dislocation-Induced Si Steels T. Mizuguchi, R. Uej, H. Miyagawa, Y. Tanaka and K. Shinagawa	2187
The Stacking Fault Energy and its Dependence on the Interstitial Content in Various Austenitic Steels L. Mujica, S. Weber and W. Theisen	2193
Work Hardening Mechanism in Soft Particle Dispersion Ferritic Steel N. Nakada, M. Murakami, T. Tsuchiyama and S. Takaki	2199
The Role of Notches on Fatigue Life of TWIP Steel in the HCF Regime T. Niendorf, P. Klimala, H.J. Maier and A. Frehn	2205
Effect of Static Aging on Mechanical Properties of an 18Cr-8Ni-W-Nb-V-N Stainless Steel I. Nikulin and R. Kaibyshev	2211
Measurement of Deformation-Induced Martensite in Stainless Steel Using Magnetic Contact Force T. Nishihara	2217
Effect of Ferrite Grain Boundary on Strain Aging Behavior in Nb-Bearing Ultra-Low-Carbon Steel Sheets Y. Ono, K. Okuda, Y. Funakawa and K. Seto	2222
Cutting Properties of Austenitic Stainless Steel by Using Linear Polarized CO₂ Laser without Assist Gas H. Ozaki, T. Mima, H. Kawakami and J. Suzuki	2228
Austenite Stabilization by Quenching and Partitioning in a Low-Alloy Medium Carbon Steel E. Paravicini Bagliani, E. Anelli and M. Boniardi	2234
Recrystallization Behaviour of Nb and Ti+Nb Added Ferritic Stainless Steels J.E. Park and S.H. Park	2240
Effect of Interpass Temperature on Microstructure and Mechanical Properties of Weld Metal of 690 MPa HSLA Steel Y. Peng, A.H. Wang, H.J. Xiao and Z.L. Tian	2246
Study of the Hydrogen Traps in a High Strength TRIP Steel by Thermal Desorption Spectroscopy D. Pérez Escobar, L. Duprez, K. Verbeken and M. Verhaege	2253
Influence of Two-Step Austempering Process on the Fracture Toughness of a Low Carbon Low Alloy (LCLA) Steel S.K. Putatunda and C. Martis	2259
Study on the Microstructure and Mechanical Properties of a High Strength Crack-Free Steel C.L. Qiu, L.Y. Lan, D.W. Zhao, X.H. Gao and J.L. Wen	2265
Microstructure, Mechanical Properties and Formability of a Duplex Steel R. Rana, J. Loiseaux and C. Lahaije	2271
Potential of Hot Rolled Dualphase Steel from Compact Strip Production CSP® in Automotive Applications C.P. Reip, C. Klinkenberg, L.C. Tong and P. Hora	2278
New Constitutive Analysis of Microstructural Evolution: Hot Compression of Gamma Iron S. Saimoto and M.X. Huang	2284
Volume Change Associated to Carbon Partitioning from Martensite to Austenite M.J. Santofimia, L. Zhao and J. Sietsma	2290
Development of Innovative and Efficient Welding Technologies for Plates and Profiles Made of High Strength Steels Using the Example of the Production of Mobile Cranes A. Scharff	2296

Model for Predicting Recrystallization Behavior of Cold Rolled Extralow Carbon Steel Sheets	
T. Senuma and Y. Takemoto	2302
Evolution of Microstructure and Mechanical Properties during Tempering of Continuously Cooled Bainitic Steels	
T. Sourmail, V. Smanio, F.G. Caballero, J. Cornide, C. Capdevilla and C. Garcia-Mateo	2308
Eutectoid Decomposition of δ-Ferrite in Ferritic-Austenitic Duplex Cast Steel - Structural and Morphological Study	
D. Dyja, Z. Stradomski, C. Kolan and G. Stradomski	2314
Precipitation Strengthening of Micro-Alloyed Steels Thermo-Mechanically Processed by Ultra Fast Cooling	
Z.Y. Liu, S. Tang, X.H. Cai and G.D. Wang	2320
Kinetics of Grain Refinement by Warm Deformation of 304-Type Stainless Steel	
M. Tikhonova, A. Belyakov and R. Kaibyshev	2326
Effect of Bake-Hardening Treatment on the Mechanical Properties of High Strength Bainitic Steel Produced by Thermomechanical Processing	
I.B. Timokhina, H. Beladi, X.Y. Xiong and P. Hodgson	2332
Microstructure Control of a Low Carbon Martensitic Stainless Steel by Quenching and Partitioning Heat Treatment	
T. Tsuchiyama, J. Tobata, T. Tao, N. Nakada and S. Takaki	2338
Influence of Matrix Structure and Hard Carbide on Abrasive Resistance of Steel Plates	
K. Ueda, N. Ishikawa and Y. Murota	2342
Influence of Substitutional Atoms on the Solubility Limit of Carbon in B.c.c. Iron	
H. Saitoh, K. Ushioda and N. Yoshinaga	2348
On the Methodology of Thermal Desorption Spectroscopy to Evaluate Hydrogen Embrittlement	
D. Pérez Escobar, K. Verbeken, L. Duprez and M. Verhaege	2354
Fatigue Property of a 2.8GPa Grade Maraging Steel	2360
Effect of Electric Current Direction on Texture Evolution in a Cold Rolled Fe-3%Si Steel under Electric Current Pulses Treatment	
X.L. Wang, H.M. Zhao, W.B. Dai and X. Zhao	2366
Effects of Magnetic Field Intensity on Carbon Diffusion in Pure Iron in the Single-Phase Austenite Region	
Y. Wu, Y. Lu, X. Zhao and L. Zuo	2372
Improved Mechanical Properties in Ti/Mo-Bearing Martensitic Steel by Precipitation and Grain Refinement	
L. Xu, J. Shi, W.Q. Cao, M.Q. Wang, W.J. Hui and H. Dong	2378
Low Temperature Precipitation in Nb-Added Si- and Si-Free Bainitic Steels	
I. Zuazo and S. Cobo	2384

Chapter 19: Superalloys High & Super HighTemp.Materials

Characterization of Precipitation Kinetics of Inconel 718 Superalloy by the Stress Relaxation Technique	
J. Calvo, S.Y. Shu and J.M. Cabrera	2393
3D Imaging Using X-Ray Tomography and SEM Combined FIB to Study Non Isothermal Creep Damage of (111) Oriented Samples of γ / γ' Nickel Base Single Crystal Superalloy MC2	
M. Jouiad, J. Ghighi, J. Cormier, E. Ostojka-Kuczynski, G. Lubineau and J. Mendez	2400
Modeling the Electrical Response of Waspaloy due to the Nucleation, Growth, and Coarsening of γ'	
R.L. Whelchel, R.A. Gerhardt and K.C. Littrell	2406
Microstructure of Thermal Barrier Coatings (TBC's) Obtained by Using Plasma Spraying and VPA Methods	
M. Góral, S. Dudek, R. Filip and J. Sieniawski	2412
Tensile Properties of Low Angle Boundaries of Single Crystal Superalloy DD6	
J.R. Li, Z.X. Shi, J.Q. Zhao and S.Z. Liu	2418

DTA Analysis on the Solidification Behavior of the Al₂O₃-Y₂O₃-ZrO₂ Ternary Oxide System and Microstructural Investigation	
H.J. Su, J. Zhang, W. Guo, J.Z. Yu, L. Liu and H.Z. Fu	2424
Crack Growth Behavior in ATI 718Plus® Alloy	
E.T. McDevitt, S.M. Oppenheimer, R.M. Kearsey and J. Tsang	2428
Precious Metals in High Temperature Applications - The Cause of Damage and its Avoidance	
J. Merker, D.F. Lupton and F. Schölz	2434
Influence of Temperature and Strain Rate on Dynamic Softening Processes in Allvac® 718Plus™	
S. Mitsche, C. Sommitsch, D. Huber, M. Stockinger and P. Poelt	2440
Oxidation Behaviors of Two and Three Phase Mo-Si-B Alloys via Si Pack Cementation	
Y.H. Song, J.S. Park, J.M. Kim and S.H. Yi	2446
A Brief Introduction to Alloy Phase Chemistry Determination under EPMA/SEM-EDS Conditions and its Applications	
Z.F. Peng, L.S. Cai, Y.Y. Dang, L. Zhao, F.F. Peng, Z.G. Yang, G.Z. Yan, S.G. Chen, J. Zhou and Y.G. Zhou	2450
Effect of Surface Recrystallization on the Low Cycle Fatigue Behavior of Directionally Solidified Superalloy DZ4 by <i>In Situ</i> SEM Studies	
X.F. Ma and H.J. Shi	2456
Microstructure and Mechanical Properties Development in Cross Roll Rolled Ni-30Cr Alloy	
K.H. Song, H.S. Kim and W.Y. Kim	2462
Microstructural Assessment of IN718: A Closed-Loop Fatigue Approach	
M. Stoschka, H. Maderbacher and M. Stockinger	2468
Influence of Stacking Fault Energy on Creep Mechanism of a Single Crystal Nickel-Based Superalloy Containing Re	
S.G. Tian, B.J. Qian, Y. Su, H.C. Yu and X.F. Yu	2474
Solidification Structure of Incoloy800 Superalloy with Electromagnetic Field	
E.G. Wang, E. Jiang, G.F. Zhan, A.Y. Deng and J.C. He	2480
Modern Control Theory Applied to Remelting of Superalloys	
R.L. Williamson and J.J. Beaman	2484
Surface Recrystallization and Twin Formation in a Single Crystal Superalloy	
J.C. Xiong, J.R. Li, Y.S. Luo and S.Z. Liu	2490
Microstructure Change of B2 Precipitates in an Fe-Al-Ni Alloy due to Two-Step Heat-Treatment	
J. Yamanaka, C. Yamamoto, Y. Kuno and M. Doi	2496
Recrystallization in HR3C Austenitic Heat Resistant Steel	
F.S. Yin, L.Q. Tian, B. Xue, X.B. Jiang and L. Zhou	2502

Chapter 20: Surface Engineering/Coatings

Foresight of Material Surface Engineering as a Tool Building a Knowledge-Based Economy	
A.D. Dobrzańska-Danikiewicz	2511
Study on Surface Roughness Transformation during Metal Rolling	
S. Almotairy, D.B. Wei and Z.Y. Jiang	2517
Antifouling Stainless Steel Surface: Competition between Roughness and Surface Energy	
M. Jimenez, H. Hamze, A. Allion, G. Ronse, G. Delaplace and M. Traisnel	2523
Improving Releasability of Mold Materials for IC Encapsulation Using Epoxy Compounds	
S. Kitaoka, N. Kawashima, M. Yoshiya, S. Miyagawa, Y. Noguchi and K. Ikemura	2529
Preliminary Study on the Fretting Wear Reliability of an Annular Nuclear Fuel	
Y.H. Lee and H.K. Kim	2535
Effect of Surface Hard Layer and Forging Conditions on the Resistance of Plastic Deformation of Hot Forging Tools	
A. Minami, Y. Tabaru, Y. Marumo, L.Q. Ruan and H. Saiki	2540
Superhydrophobic RTV Silicone Rubber Coatings on Anodized Aluminium Surfaces	
G. Momen and M. Farzaneh	2546

Laser Cladding of Nickel Alloy with Ceramic Nanopowder on Steel as Coating in Corrosive Media	
A.T. Pérez, M.A. Montealegre, J.L. Arias, G. Castro, P. Rey, M. González and F. Bouzada	2552
Oxidation Resistance and Self Hardening of CrAlN/BN Nanocomposite Coatings	
M. Nose, T. Watanuki, T. Kawabata, Y. Hatano, K. Matsuda and S. Ikeno	2559
Mechanical Properties Enhancement of High Reliability Metallic Materials by Laser Shock Processing	
J.L. Ocaña, M. Morales, J.A. Porro, D. Iordachescu, M. Díaz, L.R. De Lara and C. Correa	2565
Effect of Diffusion Condition for Aluminizing on TiAl Based Alloy	
T. Sasaki, T. Yagi, T. Watanabe and A. Yanagisawa	2571
Chemical Spray Pyrolysis Path to Synthesis of ZnO Microsausages from Aggregation of Elongated Double Tipped Nanoparticles	
C. Muiva, S.T. Sathiaraj and K. Maabong	2577
Nitriding of Ternary Iron-Based Alloys: Metastable Mixed Nitrides, Excess Nitrogen and Stress-Depth Profile	
R.E. Schacherl and E.J. Mittemeijer	2583
Characteristics of TiN Coating Films for Large Sizes Prepared by Arc Ion Plating	
K.C. Baek, C.Y. Seo, K.B. Heo, Y.S. Kim, D.J. Yoon, B.I. Kim, K.K. Lee and D.S. Han	2589
Correlation between Tribological Properties, sp^2/sp^3-Ratio and H-Content of Low-Wear Diamond-Like Carbon (DLC) Layers	
E. Vogli, F. Hoffmann, E. Bartis, G.S. Oehrlein and W. Tillmann	2596

Chapter 21: Texture

Effect of Trench Aspect Ratio on Microstructure and Texture in Damascene Cu Interconnects	
L. Chen, G.J. Yuan, J.G. Xu, F. Guo and N. Pang	2605
Orientation Gradients in α-Fibre Grains of Cold Rolled IF Steels	
P. Gobernado, R.H. Petrov, J. Moerman, C. Barbatti and L.A.I. Kestens	2611
Effect of Electric Field Strength on Texture Evolution of IF Steel Sheet during Annealing	
C.S. He, X. Zhao, W.P. Tong and L. Zuo	2617
Influence of Heating Rate and Decarburization Temperature on the Microstructure and Magnetic Properties of Grain Oriented Electrical Steel	
C.K. Hou and J.M. Tzeng	2622
Microstructure and Texture Evolution of Fe-Si Steels after Hot Dipping and Diffusion Annealing	
I.I. Danzo, K. Verbeken and Y. Houbaert	2628
Thermomechanical Treatment for Enhancing Deep Drawability of Copper-Bearing Bake Hardening Steel	
Y.M. Koo, K.H. Oh and D.N. Lee	2634
Numerical Model of Microstructure and Fracture of Coated Aluminum Alloys: A Novel Design Approach	
O. Rashwan and V. Stoilov	2640
Influence of Surface Micro Texture on Photocatalytic Function of Titanium Dioxide Film	
J. Shimizu, G. Kobayashi, N. Hasegawa, T. Yamamoto, H. Ojima, T. Onuki and L.B. Zhou	2646
Microstructure and Texture Development in Pure Ta Sheets Processed by Conventional Rolling and Cross Roll Rolling	
K.H. Song, H.S. Kim and W.Y. Kim	2652
Evolution of Crystallographic Texture in Pure Iron and Commercial Steels by γ to α Transformation	
J.K. Sung and D.N. Lee	2657
Texture Evolution in Nanocrystalline Fe Induced by Surface Mechanical Attrition Treatment	
W.Y. Chen, W.P. Tong, C.S. He, X. Zhao and L. Zuo	2663
Crystallographic Behaviors of Uni-Axial Deformed High Manganese Steels	
P. Yang, F.Y. Lu, T.Y. Liu, L. Meng and W.M. Mao	2668
Calculation Methods to Determine Crystallographic Elements Based on Electron Diffraction Orientation Measurements by SEM/EBSD or TEM	
Y.D. Zhang, Z.B. Li, C. Esling, X. Zhao and L. Zuo	2674

Effects of Magnetic Field Intensity on Microstructure and Orientation of Proeutectoid Ferrite in Fe-C Alloy	
X.X. Zhang, Y.D. Zhang, S.J. Wang, C. Esling, X. Zhao and L. Zuo	2680

Chapter 22: Thermomechanical Processing: Steels

3D Image-Based Stereology	
Y. Adachi, M. Ojima, N. Sato and Y.T. Wang	2687
Effect of Intercritical Annealing Time on Microstructure and Mechanical Behavior of Advanced Medium Mn Steels	
A. Arlazarov, M. Gouné, O. Bouaziz, A. Hazotte and F. Kegel	2693
Two Novel Methods to Realize the Superplastic Forming of Ultrahigh Strength Steels	
B.Z. Bai and H. Zhang	2699
Dynamic Recrystallization Mechanisms Operating under Different Processing Conditions	
A. Belyakov, N. Dudova, M. Tikhonova, T. Sakai, K. Tsuzaki and R. Kaibyshev	2704
Influence of Rolling Temperature and Cooling Rate on Microstructure and Properties of Pipeline Steel Grades	
V. Carretero Olalla, R.H. Petrov, P. Thibaux, M. Liebeherr, P. Gurla and L.A.I. Kestens	2710
Thermo-Mechanical Processing of Low Manganese, Titanium Added Pipeline Steels	
A. Dehghan-Manshadi and R.J. Dippenaar	2716
Determination of the Non-Recrystallisation Temperature (T_{nr}) of Austenite in High Strength C-Mn Steels	
J. Gautam, A.G. Miroux, J. Moerman, C. Barbatti, P. van Liempt and L.A.I. Kestens	2722
Modelling Deformation-Induced Precipitation Kinetics in Microalloyed Steels during Hot Rolling	
Z.L. Guo and A.P. Miodownik	2728
Effect of Quenching and Partitioning Temperatures in the Q-P Process on the Properties of AHSS with Various Amounts of Manganese and Silicon	
H. Jirková, L. Kučerová and B. Mašek	2734
Transformation of Deformed Austenite at Temperatures above the A_{e3}	
J.J. Jonas, V.V. Basabe and C. Ghosh	2740
Modeling Alloying and Thermomechanical Processing Effects on the Austenite Decomposition Kinetics and Final Microstructure of Line-Pipe Steels	
E. Khlusova, N.Y. Zolotarevsky, A.A. Vasilyev and Y.F. Titovets	2746
New Trends and Technologies in Thin-Slab Direct Rolling: Improved Microstructure & Mechanical Behavior	
C. Klinkenberg, C. Bilgen, J.M. Rodriguez-Ibabe, B. López and P. Uranga	2752
A Review of the Stress-Relaxation Method for Following the Kinetics of Precipitation, Recovery and Recrystallization	
W.J. Liu	2758
Static Softening Behaviour in High Aluminum Steels	
Z. Aretxabaleta, B. Pereda, S.V. Parker and B. López	2764
Rapid Spheroidization and Grain Refinement Caused by Thermomechanical Treatment for Plain Structural Steel	
B. Mašek, H. Jirková and L. Kučerová	2770
Behavior of Pearlite in ThermoMechanical Processing and Service-Historical Perspective	
H.J. McQueen	2776
Microstructure Modelling of Solid-State Transformations in Low-Alloy Steel Production	
M.G. Mecozzi, C. Bos and J. Sietsma	2782
Development of Asymmetric Rolling for the Better Control over Structure and Mechanical Properties in IF Steel	
D. Orlov, R. Lapovok, L.S. Tóth, I.B. Timokhina, P. Hodgson, D. Bhattacharjee and A. Haldar	2788
Hot Deformation Behaviour of Low Alloyed Steel	
C. Poletti, S. Großeiber, S. Ilie and H.P. Degischer	2794
Processing and Microstructure of Grain Non-Oriented Electrical Steel Strips with Improved Magnetic Properties	
A. Salinas-Rodríguez and E. Gutiérrez-Castañeda	2800

Effect of Magnetic Field Processing on Recrystallization and Grain Growth I. Salvatori	2806
Advanced TMCP Steel Plates for Pipelines and Structural V. Schwinn, J. Bauer, P. Fluess and E. Amoris	2812
Optimising Thermomechanical Processing with Reduced Energy Demand T. Siwecki and J. Eliasson	2818
Evaluation of the Behaviour and Properties of a High-Si Steel Processed Using Direct Quenching and Partitioning M.C. Somani, L.P. Karjalainen, D.A. Porter and R.D.K. Misra	2824
Microstructure and Property Characteristics of CSP[®]-Produced Advanced High Strength Steels W.P. Sun	2830
Physical and Mathematical Modeling of Austenite Microstructure Evolution Processes Developing in Line-Pipe Steels under Hot Rolling A.A. Vasilyev, A. Rudskoi, N.G. Kolbasnikov, S. Sokolov and D.F. Sokolov	2836
New Development and Application of Microalloyed Medium Carbon Steel for Auto Forging Products Y.J. Zhang, H. Dong, W.J. Hui and J. Peng	2842
Transformation of a High Strength Steel during Deformation at α/γ Temperature J.T. Wang, A.W. Zhang, X.M. He and S.H. Jiao	2848

Chapter 23: Thin Films & Interface Engineering

Texture Effects in Solid-State Reactions of Thin Films K. De Keyser, C. Detavernier, J.J. Sweet and C. Lavoie	2857
Delamination of Cu and Ti Thin Films Deposited by Magnetron Sputtering on Cu Substrate: Analysis of Reasons G.P. Egorov, A.A. Volkov and V.U. Golstceev	2863
Fabrication and Characterisation of Diluted Magnetic Semiconductors Thin Films Using Ion Beams M. Ionescu, P. Photongkam, R. Siegele, A. Deslantes, S. Li and D.D. Cohen	2869
A Simple Method to Create Superhydrophobic Aluminium Surfaces R. Jafari and M. Farzaneh	2874
Control of Grain Boundary Microstructures in Sputtered Gold Thin Films by Surface Energy-Driven Grain Growth S. Kobayashi, R. Fukasawa and T. Watanabe	2880
Observation of Stress-Driven Migration of Specific Planar Grain Boundaries in Al Bicrystals D.A. Molodov, T. Gorkaya and G. Gottstein	2886
Plastic Domain Microstructure and Hardness Analysis of Indented Layered Composite S. Muraishi and M. Takaya	2892
Microstructure Coating Influence for Optimized Diamond Deposition A. Poulon-Quintin, C. Faure, L. Teulé-Gay and J.P. Manaud	2898
CdS Thin Film Growths on Sapphire Substrates Having Heteroepitaxial Transparent Conducting Underlayers Y. Sato, M. Arai and K. Ito	2904
Diffusion Behavior and Interfacial Reaction of Heterogeneous Metal Systems Controlled by High Magnetic Fields D.G. Li, Q. Wang, K. Wang, C. Wu, G.J. Li and J.C. He	2910
Single Photon Generation from Nitrogen Atomic-Layer Doped Gallium Arsenide K. Takamiya, Y. Endo, T. Fukushima, S. Yagi, Y. Hijikata, T. Mochizuki, M. Yoshita, H. Akiyama, S. Kuboya, K. Onabe, R. Katayama and H. Yaguchi	2916

Chapter 24: Welding & Joining

Dynamic Resistance Based Model for On-Line Resistance Spot Welding Quality Assessment A. El Ouafi, R. Belanger and M. Guillot	2925
---	------

Specific Energy as a Characterizing Parameter for Laser Welded Ti-5Al-5V-5Mo-3Cr Alloy T. Shariff, X.J. Cao, R.R. Chromik, J. Gholipour Baradari, P. Wanjara, J. Cuddy and A. Birur	2931
Microstructural Characterisation of Railhead Damage in Insulated Rail Joints C. Rathod, D. Wexler, T. Chandra and H. Li	2937
Simplified Simulation of the Friction Stir Welding Process. Influence of the Boundary Conditions Modelling C. Desrayaud	2943
Experimental and Numerical Investigation of Residual Stress and Distortion Control during Welding of AISI-316L Plates A.M.A. Pazooki, M.J.M. Hermans and I.M. Richardson	2950
Laser Joining of Metal and Plastic Using Insert Materials M. Hino, Y. Mitooka, K. Murakami and T. Kanadani	2956
Low Temperature Sintering Bonding Process Using Ag Nanoparticles Derived from Ag₂O for Packaging of High-Temperature Electronics A. Hirose, N. Takeda, Y. Konaka, H. Tatsumi, Y. Akada, T. Ogura, E. Ide and T. Morita	2962
Thermoplastic Adhesive for Thermosetting Composites M. Hou	2968
Dissimilar Metal Joining of Steel to Aluminum Using the Arc Heat Source Y. Kim, K.Y. Park, Y.S. Kim and S.J. Kim	2974
Optimization of Welding Parameters for Repairing NiAl Bronze Components H.J. Li, D. Grudgings, N. Larkin, J. Norrish, M. Callaghan and L. Kuzmikova	2980
Effect of Water Cooling on Grain Structures and General Mechanical Properties of 2219-T6 Friction Stir Welded Joint H.J. Liu, H.J. Zhang and L. Yu	2986
Hybrid Laser-Arc Welding of HSLA-65 Steel Plate: Microstructural and Mechanical Property Evaluation of Butt Welds C. Munro, A.E. Nolting, X.J. Cao and P. Wanjara	2992
Optimization of Laser Welding Parameters in Aluminum Alloy Welding and Development of Quality Monitoring System for Light Weight Vehicle Y.W. Park and D.Y. Kim	2998
Resistive Implant Welding of Advanced Polymers E. Rodríguez-Senín, R. de la Mano and L. Blanco	3004
Development of Low Temperature Bonding Technique of Titanium and Zirconium Using Hydrogen Diffusion-Induced Phase Transformation K. Saida, H. Ogiwara and K. Nishimoto	3010
Preliminary Investigation on Friction Spot Welding of AZ31 Magnesium Alloy L.C. Campanelli, U.F.H. Suhuddin, J.F. Dos Santos and N.G. Alcantara	3016
Linear Friction Welding of a Single Crystal Superalloy P. Wanjara, E. Dalgaard, J. Gholipour and J. Larose	3022
Microstructure and Wear Characteristics of Fe-Based Hard-Facing Alloy Claddings Formed by Gas Tungsten Arc Welding C.M. Lin and W. Wu	3028
Parameters Influencing Steady-State Grain Size of Pure Metals Processed by High-Pressure Torsion K. Edalati and Z. Horita	3034
Modelling Textures Formed during the Plane Strain Compression and Subsequent Static Recrystallisation of Body-Centred Cubic (BCC) Metals Y.J. Lan and C. Pinna	3040
Effect of Silicon on the Microstructure, Tensile Properties and Hot Tearing Susceptibility of AZ91E Alloy C. Ravindran and S.L. Sin	3046
Effect of Pre-Strain on Fatigue Behaviour of AZ31 Mg Alloy G.F. Quan, Y.B. Zhang and Z.M. Liu	3052