

# Table of Contents

## Preface and Committee

## Chapter 1: Composites

<b>Analysis of the Geometry and Microcracks of Kevlar/Epoxy Composites</b> V. Mušutova, P. Tej, J. Kolísko and M. Černý	3
<b>Effect of Diamond Shape on Surface Roughness of Diamond/Cu Composites</b> W. Cui, S.B. Ren, J.H. Chen, X.B. He and X.H. Qu	8
<b>Effect of Diamond Shape on Thermal-Physical Properties of Diamond/Cu Composites</b> J.H. Chen, S.B. Ren, X.B. He and X.H. Qu	12
<b>Effects of Sintering Temperature on Microstructure and Wear Properties of Al<sub>2</sub>O<sub>3</sub> Particle Reinforced Al Composites</b> T.G. Wang, Q. Qin and Q.C. Liang	16
<b>Preparation of Nickel-Based Al<sub>2</sub>O<sub>3</sub>-TiB<sub>2</sub> Composite Ceramic Powder</b> F. Xu, X.P. Zhou and Y.Z. Fang	20
<b>The Influence of Sintering Temperature and Whisker Content on the Flexural Strength of Aluminum Borate Whisker Reinforced Aluminum Phosphate Composite Materials</b> G. Peng	24
<b>The Study of Composite Material of Al-C System</b> V. Andreyachshenko, S. Lezhnev, D. Kuis and E. Panin	29

## Chapter 2: Low-Dimensional and Nano-Materials

<b>Atomistic Simulation on Buckling Behavior of Monolayer Graphene</b> C.R. Zhen, Y.L. Chen, C. Qiao and Q.J. Liu	35
<b>Modeling and Simulation for Current-Illumination Characteristics of Carbon Nanotube</b> Y.J. Pei, J.J. Bai, D.J. Xu, Y. Wu and X.Y. Zhang	39
<b>Preparation and Thermal Fatigue Behaviors of Silicon Nitride Nano-Ceramics</b> C.Y. Tian and H. Jiang	48
<b>Study on Dispersion and Rheology of Particles in Water-Based Nano TiN Fluid</b> X.W. Ouyang, Z.Y. Wu and Z.Y. Mo	53
<b>Transmission Performance of Water-Based Nano Fluid Based on Computational Fluid Dynamics</b> Z.Z. Song, Z.Y. Wu and Z.Y. Mo	58
<b>β-Cyclodextrin Modified Hybrid Magnetic Nanoparticles as an Adsorbent for Phenol Removal</b> S.T. Cai, M. Zhou and X. Qian	63
<b>The Preparation of ZrO<sub>2</sub> and the Influence of the Calcination Temperature</b> Y. Zhu, X. Zhang and S. Yuan	67
<b>The Synthesis of Single-Crystal BiOI Nanoplates with {001} Facets Exposed</b> D. Zhang, L. Chen, T. Wei, C.J. Xiao and Z.Q. Wang	72

## Chapter 3: Metal-Based Materials and Alloys

<b>A Study on Mechanical and Fatigue Properties of a Stainless Steel</b> J.T. Zhao, Y.R. Zuo and W.P. Zhao	79
<b>Development of 590MPa Grade Hot-Dip Galvannealed DP Steels</b> Y.H. Jiang, S. Kuang, H.S. Liu and H.X. Teng	83
<b>Effect of Annealing Temperature on Microstructure and Damping Capacity of Twin Roll Cast ZK60 Alloy</b> Q.H. Zang, Y.K. Shi, H.M. Chen, J. Zhang and Y.X. Jin	87

<b>Effect of Ca and Nd Alloying on the Microstructure of Mg-6Al-Ca-Nd Alloy</b> Y.C. Feng, Q. Wang, S.C. Zhao, W.Y. Jiang, L.P. Wang and E.J. Guo	91
<b>Effect of Cu on the Electrochemical Corrosion Behavior of Sn-8Zn-3Bi Lead-Free Solder Alloy</b> L. Ma, Q. Hu and Y.B. Sun	95
<b>Effect of Electropulsing Rolling on the Microstructure and Properties of Industrial Pure Titanium TA1</b> X.Z. An, C. Xu and Y.H. Guo	99
<b>Effect of Er on Microstructure and Hardness of Al-Zn-In Alloy</b> H. Li, Z.B. Xu, J.M. Zeng, H. Li, R. Chen and Y.Y. Lu	103
<b>Effect of Grain Size on Microstructure and Orientation of Fe-25Mn-3Si-3Al Steel</b> Y.J. Dai, J.G. Wang, H.E. Mao, Z.L. Mi and C. Zhang	107
<b>Effect of Nd on Primary Silicon and Mechanical Properties of Hypereutectic Al-17.5%Si Alloy</b> W.X. Shi, C.W. Du, B. Liu and P.Y. Wang	111
<b>Experiment and Analyses on 16 Mn Steel under Cyclic Loading Controlled by Strain</b> Q.L. Zhang, Y.K. Xiang and G.H. Xiao	115
<b>Experimental Study on the Effect of Retained Austenite on the Impact Toughness of a Low-Carbon Martensite Steel</b> L.G. Peng, W.J. Liu, X. Liu and Y. Zhi	119
<b>Galvanic Corrosion of 70-30 Copper-Nickel Alloy in Contact with Nickel-Aluminum Bronze in Simulated Deep Sea Environment</b> Q. Xing, L. Fan, W.M. Guo, X.X. Chen, L.H. Gong and C. Yang	124
<b>High Temperature Oxidation Investigation of Hot Roll Material with High-Speed Steel</b> L. Hao, Z.Y. Jiang, Z.X. Chen, D.B. Wei, X.W. Cheng, S.Z. Luo, L.Z. Jiang, M. Luo and L. Ma	130
<b>Influence of Neodymium on Wear Resistance of Hypereutectic Al-Si Alloy</b> W.X. Shi, C.W. Du, G.M. Li and Z.M. Liu	135
<b>Influence of Pre-Deformation Strain on Recovery Performance of Ni<sub>47</sub>Ti<sub>44</sub>Nb<sub>9</sub> Alloy Φ8mm Pipe Joint</b> K.L. Wang, S.Q. Lu, G.F. Li, J.W. Liu and E.M. Wang	140
<b>Influence of Solution Treatment on the Microstructure and Mechanical Properties of an Deformed Al-12.7Si-0.7Mg Alloy</b> F. Liu, F.X. Yu, K. Hu, D.Z. Zhao and L. Zuo	145
<b>Investigation on the Property of High Si-Al Alloy Prepared with Ultrasonic Vibration Aided Casting Technology</b> J. Zhang, Y. Li, L.Z. Zhao, M.J. Zhao and X. Jiang	150
<b>Isothermal Crystallization Behavior of Cu<sub>42</sub>Zr<sub>42</sub>Al<sub>8</sub>Ag<sub>8</sub> BMG Investigated with Electrical Resistance Measurement</b> D.H. Man and Q. Li	155
<b>Liquid-Phase Separation of Undercooled Fe-Cu-Si Alloy</b> P.H. Wu, N. Liu and Z.X. Zhu	160
<b>Manufacturing Technology Research of Magnesium Alloy Transmission Case</b> D. Wang, S.R. Wang, Z.D. Zhang and W. Wu	164
<b>Measurement of TTP Curves of 7050 Aluminum Alloy by Conductivity</b> L. Kang, G. Zhao, N. Tian and H. Fu	168
<b>Micromechanics Analysis of Elastic Modulus of Alumina-Carbon Refractories</b> T.F. Ma, H.X. Li, X.F. Wang and G.Q. Liu	175
<b>Modification of Hypereutectic Al-20%Si Alloy by Neodymium</b> W.X. Shi, C.W. Du, G.Z. Lv and C.W. Liu	180
<b>Research on Heat Resistance of As-Cast Ferritic Nodular Iron</b> B.Y. Li, G.S. Zhang, S.Z. Wei and J.W. Li	184
<b>Study on High-Temperature Mechanical Properties of SPHC Steel Produced by CSP Technology</b> Q.C. Peng, J.J. Wang and Z.B. Tong	188
<b>Study on Microstructure and Property of High Boron Alloyed Stainless Steel Composite Plate Containing Titanium</b> J. Liu, J.T. Han and Y.L. Liu	193
<b>Study on Multi-Alloy Ingots Produced Using Hot-Top DC Casting Approach</b> X. Han and J.Z. Cui	199

<b>Test and Research on Ratchet Effect of 16 Mn Steel under Cyclic Loading</b> G.H. Xiao, Y.K. Xiang and Q.L. Zhang	205
<b>The Feature of Slag from Complex Hot Metal Blown by Converter Processing and its Influence on the Craft</b> J.L. Zheng, C.Y. Wu, M. He, X.Q. Zheng and Z.D. Ren	209
<b>The Phase Structures and Properties of Pt-Ir-M (M=Zr, Mo, Y) System</b> M. Xie, Y. Chen, J.M. Zhang, J.Q. Hu, Y.C. Yang, Y.T. Chen, S.B. Wang, S. Wang and S. Chen	214
<b>Determination of Al, Cu, Ni in Zr-Based Amorphous Alloy by Inductively Coupled Plasma Atomic Emission Spectrometry</b> L. Ma, G.H. Qin, Q. Yu and J. Zhou	218
<b>Ti-Al-Zr-B-Y Amorphous Alloy Powders Prepared by Mechanical Alloying</b> Y.Y. Zhu, Y.H. He and Q. Li	222

## Chapter 4: Building and Construction Materials

<b>Comparison and Analysis of RC Beams Strengthened with FRP Bonded on the Side and Bottom Surface</b> X.J. Chen, X.E. Zhu and C.H. Gao	229
<b>Effect of Basalt Fibers on Rheological Property of Asphalt Mortar</b> N. Wang, C.S. Li and C.Y. Xu	233
<b>Experimental Research on Anti-Cracking Ability of Polyacrylonitrile Fiber Mortar</b> J.C. Yang, C.M. Wang, S.G. Wang, Q. Chen and J.H. Chen	237
<b>Experimental Study of Influences of Initial Temperature on Cement Grout Performance</b> J.C. Yang, W.P. Wang, S.G. Wang, J.H. Chen and W. Yang	242
<b>Impact of Composite Mineral Admixture on Carbonization Resistance of High Performance Concrete</b> Y.G. Wang, P. Ma, K.J. Huang, G.Q. Zhang and Y.F. Hu	248
<b>Influence of Layered Materials on Properties of Cement Stabilized Macadam</b> Q.H. Ma, M.Y. Qu, X.S. Xu and L.L. Hu	254
<b>Inversion of Material Parameters of Composite Fiberglass Box Structure</b> H. Chen, F. Wang, H. Liu and J. Zhang	258
<b>Mechanical Properties of High Strength Desert Sand Concrete</b> H.F. Liu, J.R. Ma, Y.L. Chen and D. Yang	263
<b>Nonlinear Structural Analysis of Fire-Exposed Reinforced Concrete Column</b> L.X. Liu, L. Lv and Y.F. Zhao	267
<b>Research on Separation and Regeneration Aggregate of Recycled Asphalt Mixture Road Performance</b> X.F. Zhou and X.J. Xu	276
<b>Comprehensive Evaluation of Asphalt-Mixture Performance Based on Principal Component Analysis</b> P. Tian, G.F. Zhan and L. Nai	280

## Chapter 5: Biomaterials and Technologies

<b>A Comparison of Gelling Properties Stability of Dry-Heating and Maillard-Type Egg White Proteins</b> W. Xu, H.B. Wang and T. Xiang	287
<b>Fabrication an Antibacterial Surface on Composite Porous Scaffold</b> J.X. Jiang, L.M. Li, J. Wang, G. Li, Y. Zuo, Y.B. Li and J.D. Li	291
<b>Investigation of the Surface Modification on Biomedical Magnesium Alloy</b> Y.D. Xu, J.Q. Xiong, S.G. Xu and J.J. Zhang	295
<b>Nonenzymatic Glucose Electrochemical Oxidation Based on Pt Decorated MWCNTs-PVA Hybrid Electrode</b> S.M. Liu, Y.D. Zheng, L.Y. Cui, C.K. Zhao, Y. Xiao, T. Zhang, L.N. Yue and J. Chen	299
<b>RSM as an Approach to Optimize Ginger Intermittent Microwave Drying Process</b> L.L. Zhang, B. Wang, L.H. Zhang and M. Zeng	304

<b>Study of the Degradation Behaviour of Biomaterial Mg-4.0Zn-2.0Sr Alloy in SBF</b> T. Cui, R.G. Guan, H.M. Qin and F.L. Song	309
<b>Synthesis and Characterization of the Bio-Based Oligomer</b> L. Cheng, Y.F. Zhang, L.W. Yu and C.Q. Fu	314
<b>The Influence of the Addition Element of Zn and Sr to Degradation Behavior of Pure Magnesium</b> T. Cui, R.G. Guan, C. Yang, H.M. Qin and F.L. Song	318
<b>Electrospun Hydroxyapatite/BMP-2 Grafted PLLA Nanofibers for Guided Bone Rebuilding Scaffold</b> X.Z. Yang and Z.S. Li	322

## Chapter 6: Chemical Materials and Technologies

<b>Effect of Dimethyl Sulfoxide (DMSO) on Cellulose Solution with High Concentration</b> H.T. Cao, J. Song and X.L. Fang	329
<b>Flexible Graphene Paper as a Binder-Free Anode Material for Lithium Ion Batteries</b> C.N. Yang, Y.Q. Qing and C.S. Liu	333
<b>Highly Selective Separation and Enrichment of Phosphopeptides by Uranyl-Salophen Immobilized Silica Gel Material</b> C.H. Xu, G.L. Zhang, X. Zhou, X.L. Xiao, C.M. Nie and L.F. Liao	341
<b>Influence of Co(ii) Ionic Liquids Catalytic System for Polycarbonate (CHO/CO<sub>2</sub>) Synthesis</b> J. Tian, Q. Zhang, W.F. Li, Y. Meng, T. Yan, H.K. Wang, Y.F. Li, M.S. Liu and H.F. Guo	345
<b>Preparation of Sodium Paeonolsilate Intercalated into Layered Double Hydroxides and its Release Properties</b> L.H. Gu, H.Q. Song, Z.Y. Sun, J.Y. Zheng, J.W. Zhang, L. Wang, F.L. Xu and C.G. Lin	349
<b>Preparation of Zeolite from Waterworks Sludge for Ammonium Ion Removal in Wastewater</b> C.X. Zhao, C.H. Zhang, T. Meng, S.S. Han, J.Y. Jiang, Q.X. Yin, M.T. Guo, B.Q. Shao and G.J. Rong	355
<b>Radical Polymerization of a Novel Methacrylamide Derivative</b> C. Yuan, P. Liu, L.H. Chen and Y. Zhang	359
<b>Simulation Study of the Volume Properties and Diffusion of 1-Butyl-3-Methylimidazolium Tetrafluoroborate/Ethanol Mixture</b> G.C. Tian and D. Wang	363
<b>Sorption of Pb(II) on Iron Hydroxide Modified Diatomite</b> Y. Wang, Y.F. Lu, Y. Jiang, L. Ma, L.J. Ma and M.Y. Wang	367
<b>Synthesis and Application of the Three-Component Lyotropic Liquid Crystal</b> Q.L. Yang, X.R. Guan, X.N. Xie, S.W. Wei and Y.W. Fang	371
<b>Synthesis and Characterization of Thiol Functional Cyclic Carbonate</b> W.C. Li, H.H. Zhang, Y.L. Li and C.Q. Fu	377
<b>Synthesis and Crystal Structure Hindered Amine with Methacrylate</b> W.W. Xue, X.Q. Zhang, Q. Chen, J. Jin and G.Y. Lu	381
<b>Synthesis of Hyperbranched Polyphenylacetylene Resins and the Influence of their Molecular Architecture on their Properties</b> K. Gu and X.D. Xu	385
<b>The Application of Dye Materials on Efficient Visible Light Photocatalysis</b> Y.S. Yang and Y. Zhang	393
<b>Biomineralization-Inspired Synthesis for Hierarchical Structured ZnO Powders with Enhanced Photocatalytic Activity</b> J.J. Xie, H. Zeng, M.H. Wang, S.H. Xie and Z.Y. Fu	397
<b>Evolution of Phase Structure and Micro-Morphologies of the La<sub>0.7</sub>M<sub>0.3</sub>MnO<sub>3</sub> (M=Ca, Sr) Sintered at Different Temperature</b> S.Q. Jiang, G. Wang, Z.S. Li, Z.H. Wang, Z.H. Zhou and J.B. Cheng	402
<b>Study of Salen(Al) Complex Catalytic System in Ring-Opening Polymerization of Lactide</b> Y. Nie, J. Tian, Q. Zhang, M.F. Du, X.L. Hao, H.X. An, H. Li, Y.J. He and X.J. Meng	407
<b>Conversion of Chitosan into 5-Hydroxymethylfurfural via Hydrothermal Synthesis</b> J.X. Feng, H.J. Zang, Q. Yan, M.G. Li and B.W. Cheng	411

<b>Density Functional Studies on the Standard Heats of Formation for Nitroaromatic Molecules</b> X.F. Su	415
<b>Influence of Cadmium Oxide on Thermal Hazard of AP-CMDB Propellants</b> H.N. Jia, G.E. Lu, Z.T. An, J.Y. Jiang, Q. Ge, S.G. Wang and Z. Hu	419
<b>Swelling Kinetic Study of Poly(Vinyl Alcohol)/Poly(<math>\gamma</math>-Glutamic Acid) Blend Hydrogel</b> M.M. Zhang, Y.X. Chen and X. Ma	423

## Chapter 7: Material Testing, Characterization and Applications

<b>Analysis of Impact of Moisture Content on Rock Thermal Conductivity Coefficient Using TCS Method</b> Z.W. Yu, Y.J. Zhang and P. Gao	429
<b>Effect of Surface Treatment on the Stress Corrosion Cracking of 304 Austenitic Stainless Steels in Acid Chloride Solution</b> L.Y. Huang, S.H. Li, H.Q. Zhu, D.Y. Cheng and F.F. Zhang	433
<b>Fatigue Properties and Fracture Characteristics of the Aluminum Alloys for High-Speed Train Carbody</b> F. Qiu and Q. Li	437
<b>Influence of Predeformation on Mechanical Behavior of Hastelloy C-276</b> C. Feng, D.F. Li, S.L. Guo, X.A. Liu and S.P. Liu	442
<b>Iron Temperature Field Finite Element Analysis and Measurement Verification</b> H. Sun	447
<b>Lifetime Estimation of Chain Plates for Floodgates Working in Seawater by Continuum Fatigue-Creep Damage Theory and Transient Analysis of Diffusion Process of Hydrogen</b> M.C. Jong, L.Y. Xie, H.J. Song, S.J. Jon, M.I. Kim and X. Lv	452
<b>Qualimetric Evaluation of Aluminum Wire Deformed by a Combined Scheme of Deformation “Pressing-Drawing”</b> S. Lezhnev	458
<b>Strength Testing of Fabric Composite Material and Impact Simulation for Airbag Landing System</b> J.Z. Wei, H.F. Tan, B. Song and Z.M. Wan	463
<b>Study of Influence Factors on Medium-Density Fiberboard Thermal Analysis</b> L. Liu, Z. Xing, Y.X. Liu and H. Yi	468
<b>Study on Testing Methods for Thermophysical Properties of Materials</b> Z. Hu, J.Y. Jiang, G.E. Lu, Q. Ge, S.G. Wang, H.N. Jia and P. Zhang	471
<b>The Estimation of the Thermal Properties of Refractory Materials According to the Temperatures Acceleration Curve at the Blast Furnace Blowing-In</b> A.N. Dmitriev, M.O. Zolotykh, Y.A. Chesnokov, O.Y. Ivanov and G.Y. Vitkina	476
<b>The Evaluation of Absorption Performance of Magneto-Rheological (MR) Elastomer</b> K.H. Lee, K.S. Jung and C.H. Lee	483
<b>Non-Linear Finite Element Analysis on Rubber O-Sealing Ring of SRM</b> J.Z. Chen, M.X. Huang and X.R. Wang	490
<b>Preparation Method and Device of Microcellular Sheet Based on Batch Foaming</b> X. Xiao, X.T. He, Y.M. Ding, L. Qin and W.M. Yang	495
<b>The Effect of Laser Power Density on Laser Covered Graphene</b> B.R. Hai, K.K. Guo and C.S. LIU	501
<b>Elastic-Plastic Constraints Analysis for Hole-Edge Crack</b> Y.Q. Xie, Z.X. Wang and Y.Q. Zhang	505
<b>Study on Phenolic Foams Modified by Graphene Oxide</b> J.P. Luan, X.F. Wei, X.P. Zhou, G.Z. Lu, C.Z. Liu, G.D. Li, Y.X. Na, H.W. Wang and X.W. Qi	510
<b>Experimental Research about Polyester Viscose Seat Fabric Water and Oil Repellent Finishing</b> T.H. Yan	514
<b>An Experimental Study of Compatibility for Metallic Inserts Bonded into CFRP Laminates Soaked in Aircraft Fuel</b> X.M. Chen, J. Liu, J. Xu, H. Zhang, F.T. He, K. Hou and Z.W. Wang	518

<b>The Method of Two-Dimensional Stretching to Reduce Residual Stress in Quenched Thin-Walled Aluminum Alloy</b>	
K.Q. Wang, W. Zheng and D.D. Na	523
<b>Application Research of Oriental Silicon Steel Sheet Used in the Table Motor</b>	
T. Dong, K. Liu, L.F. Liu and Y. Hua	527
<b>Investigation on Compression Properties of Syntactic Foam Reinforced by Warp Knitted Spacer Fabric</b>	
C. Zhi and H.R. Long	531
<b>New Aluminum Plated Corrugated Cardboard Material and Application</b>	
Y. Zhou, W. Zhou and J.W. Wang	535
<b>The Lightweight Design and Simulation of Hydraulic Steel Gate with Metal Sandwich Construction</b>	
X. Li, G. Tong and Y.H. Zhou	539
<b>Mathematic Model of Liquidus Temperature in Quaternary Aluminum Phase Diagram</b>	
K. Qiu, R.C. Wang and C.Q. Peng	545
<b>Research and Application of Model Materials Based on Soft Rock Model Test</b>	
J.C. Yang, B.H. Song, Q. Chen, W. Yang and J.H. Chen	549
<b>Soft Soil Subgrade Vacuum Preloading Consolidation Deformation Analysis of Large Rigid Foundation</b>	
B.H. Song, C.M. Wang, S.G. Wang, J.H. Chen and L. Ke	556
<b>Compression Performance of Composite Stiffened Panels with Scarfed Holes and Scarfed Bonded Repairs</b>	
S.Q. Li, Z.D. Guan, H.C. Nie, Z.S. Li and X. Guo	561
<b>Loading Tests of Thin Plates Made of Ultra-High Performance Concrete Reinforced by PVA Fibers and 2D Textile Glass Reinforcement</b>	
P. Tej, J. Kolísko, P. Bouška, T. Bittner and V. Mušutová	569
<b>Erosion Study of Silica Phenolic Nozzles with Graphite Inserts in Solid Rocket Motors</b>	
X. Chen, R. Liu and H.Y. Du	573
<b>Study on Constitutive Equation of 7085 Aluminum Alloy under High Deformation Temperature</b>	
R.B. Mei, B. Zhang, B. Cai, X.Y. Zhang, Z.T. Zou, Y.N. Liu and C.S. Li	579
<b>Microwave Dielectric Properties of <math>(\text{Ca}_{0.8}\text{Sr}_{0.2})_x(\text{Li}_{0.5}\text{Nd}_{0.5})_{1-x}\text{TiO}_3</math> Ceramics</b>	
Y. Yang, C.L. Yuan, G.H. Chen, F.W. Peng and T. Yang	583

## Chapter 8: Surface Engineering and Coating Technology

<b>A Comparison of the Complex Wettability between Locust and Moth Wing</b>	
G. Sun and Y. Fang	593
<b>An Improved Indentation Method for Estimating Limits of Fracture Toughness in Brittle Films</b>	
K.K. Fu, Y. Chang, L. Chang and B.L. Zheng	598
<b>Effect of <math>\text{Y}_2\text{O}_3</math> on Microstructure and Oxidation Behavior of Aluminide Coating on Ni-Based Superalloy</b>	
Y.Q. Hua, Z. Rong, K.M. Chen, Y.X. Ye, W.H. Wu and R.F. Chen	603
<b>Effects of Nano Silver Film on the Hydrophobicity of Moth Wing</b>	
Y. Fang and G. Sun	608
<b>Microstructures and Mechanical Properties of Aluminum Coating Produced by Friction Stir Processing</b>	
Y.Z. Fang, X.P. Zhou and F. Xu	612
<b>Ni-Cr-Al Coating Layer Modified by Friction Stir Processing - Analysis of Microstructure and Element Diffusion</b>	
L.K. Zhu, X.P. Zhou, Y.Z. Fang and F. Xu	616
<b>Research on Induction Cladding Alloy Layer on the Surface of Steel Parts and its Performance</b>	
J.W. Liu and F.X. Zhang	620
<b>Research on the Modification of Water-Borne Inorganic Zinc-Rich Coatings and its Performances</b>	
L. Chen, Z.Q. Wang, T. Wei and C.J. Xiao	626

<b>Study on Macroscopic Morphology, Microstructure and Hardness of F313 Iron-Based Coatings Prepared by Laser Cladding Using Different Powder Feed Rate</b> Y.Z. Sun, S. Liu, S.Y. Wang, J.B. Li, C.N. Yang, B.R. Hai, X.R. Zhang and C.S. LIU	631
<b>The Effect of Scanning Power on AISI 434L Stainless Steel-Based Composite Laser Cladding Coatings</b> S.Y. Wang, Y.Z. Sun, J.B. Li, K.K. Guo, B.R. Hai, C.N. Yang and C.S. LIU	636
<b>The Influence of CTAB Surfactant on the Dispersion of Al<sub>2</sub>O<sub>3</sub> Particles and Deposition Rate of Electroless Ni-P-Al<sub>2</sub>O<sub>3</sub> Coatings</b> D.Y. Liu and J. Yu	641
<b>The Morphology in Film of Polystyrene-b-Polylactide after Temperature Annealing Process</b> T. Chen and J.N. Zhang	647
<b>The Role of Hierarchical Micro-Morphology in the Wetting Property of Moth (Geometrinae) Wing Surface</b> G. Sun and Y. Fang	651
<b>Study on Wear Mechanism of an AlSi–Hexagonal Boron Nitride Abradable Seal Coating</b> T. Liu, Y.G. Yu, J. Shen, J.M. Liu and Q.Y. Lu	655
<b>Preparation and Properties of Water-Based Ultra-Thin Fireproof Coating for Steel Structures</b> Y.C. Zhang and Z.F. Li	662
<b>Structure and Field Emission Properties of CN<sub>x</sub> Powders Synthesized by a Polymerization Process</b> C.X. Zhai, L.L. Zhao, Z.Y. Zhang and W. Zhao	666

## Chapter 9: Materials Processing Technology and Applied Research

<b>A New Hot Stamping Process with Quenching and Partitioning Treatment</b> P.X. Liu, X.Y. Yu, K. Wang, B. Zhu, L. Jian and Y.S. Zhang	673
<b>Analysis of Microstructure and Mechanical Properties of 2A97T3 Al-Li Alloy Fiber Laser Welding Joint</b> Z. Yi, L. Chen, E.G. He and M. Chang	677
<b>Analysis of Stress and Strain on Shaft Parts for Closed Type of Cross Wedge Rolling during Stretching Stage</b> K.Y. Ji, X.D. Shu and C. Cheng	684
<b>Analysis of Transverse Flatness Distribution of Steel Plate during the Quenching Process</b> Y.L. Wu, D.C. Wang and L. Kong	689
<b>Analysis on the Welding Thermal Field and Residual Stress of Thick Plate</b> J.H. Jiang, Q. Wang and W. Lv	693
<b>Application Research of Hot Stamping Base on the Forming History</b> N. Ma, K.S. Liu, Q.K. Liu and Y.J. Ma	698
<b>Calculation Method of Laser Spot Coincidence Degree of Laser Micro Machining</b> F.L. Yao, L.B. Guo, Y.F. Duan and M. Guo	704
<b>Comparison of Stress Filed and Deformation of MAG and TIG for Cr13 Based on Finite Element</b> Y.X. Mao, M.Q. Yang, H.R. Yue, H. Yang, Z.G. Li and Y.Z. Zhang	711
<b>Development and Application of Process Control System to the Pilot Hot Rolling Mill</b> Z.J. Jiao, C.Y. He, M. Liu, J.P. Li and Y. Gao	717
<b>Development and Research of Pressing Technology of Billets in New Design of Equal Channel Step Matrix</b> S.N. Lezhnev, A.B. Naizabekov, E. Panin and A.O. Tolkushkin	722
<b>Effect of Deformation Temperature on Microstructure Evolution for 20CrMnTiH Steel during Hot Compression</b> W. Feng and S.T. Wu	727
<b>Effect of Edge Masking on Residual Stress of Hot-Rolled Strip on Run-Out Table</b> X.H. Liu, F. Dong and D.C. Wang	732
<b>Experimental Study on Cryogenic Gas Atomization Jet Cooling Difficult-to-Cut Material</b> X.Y. Guan and A.S. Wu	736
<b>Experimental Test on Continuous Drying Sintering Apparatus by Heating Roller Type</b> B. Gao, X.G. Zhang and W.Q. Wang	741

<b>Grafting Polypropylene under Ultrasonic in Water Suspension System</b> S. Zhang, B.D. Zhu, Q.M. Meng, N. Li and J. Wang	746
<b>Influence of Plasma Torch Nozzle Design on Plasma Arc Analyzed with Finite Element Method</b> H.Y. Wang, Y. Jiang, Y.P. Xia and Y.L. Zhou	751
<b>Influence Rules of Technological Parameters on End Quality in Closed Cross Wedge Rolling (CWR)</b> C. Liu, C. Shu, C. Chao and B.S. Sun	756
<b>Investigating the Application of Ultrasonic Welding Technology in Waterproof Composites</b> H. Shi, J.P. Wang, L.X. Zhang and S.H. Luo	762
<b>Kinetics Analysis on Process of Direct Smelting and Alloying between High-Carbon Ferrochrome and Molybdenum Oxide</b> H.M. Wang, Y. Li, X.J. Fan and G.R. Li	766
<b>Metal Turning Mechanical Model of Machined Surface Roughness</b> Q. Li, M.C. Xiong and Y.Y. Liu	770
<b>Noise Analysis of Diamond Saw Blade</b> M. Zhao, L. Zhang, B.M. Tang and K. Maher	773
<b>Numerical Simulation of Distortion of Rectangular Tube with Multi-Point Stretch Bending</b> X.F. Chen, H.L. Peng and Y. Yuan	777
<b>Numerical Simulation of the Dynamic Stress Field Based on DEFORM in the Friction Stir Welding of Al Alloy</b> Z.K. Zhang, J. Peng and X.J. Wang	781
<b>Optimization of Rolling Modes on the Mill 1700 of JSC "ArselorMittal Temirtau" with Aim to Increase Quality of Sheet Rolled Products</b> A.B. Naizabekov, V.A. Talmazan, S.N. Lezhnev, E. Panin, A.S. Erzhanov and A.O. Tolkushkin	786
<b>Parameter Optimization for Grinding Process of Micropores with High Aspect Ratio</b> F.C. Tsai, Y.L. Lee and J.C. Yeh	795
<b>Parameters Research of Precise Straightening Process in Roll Straightener</b> Q. Chen, S. Li, Y. Luo and W.L. Lu	800
<b>Pass Design and Finite Element Simulation for Trapezoidal Stainless Steel Sieve Bar</b> Y.Q. Wang, R. Liu and L. Pan	804
<b>Quality Cost Analysis of Typical Forging Based on SPC and DEA Model</b> S.H. Huang and X.S. Xia	808
<b>Radius Compensation in Lateral Bending of L-Shape Plate Considering Rollers Deflection</b> J. Liu, Z.J. Li, L.Y. Li and X. Li	816
<b>Research and Application of Milling Parameters Optimization Based on Genetic Algorithm</b> M.M. Hu, Y. Zhang and S.W. Yuan	820
<b>Research and Development of Precision MIG/MAG Welding</b> L.D. Meng, Q. Zhang, Y.L. Di and W. Shen	824
<b>Research of Fused Deposition Modeling Process Oriented Component Design</b> Z.F. Huang, Y.L. Ma, J.H. Wei, A.Q. Pan and J. Liu	828
<b>Research on Dynamic Recrystallization Behavior of Extra-Heavy Backup Roll Forming Process</b> D.H. Yoon, H. Yu and D.W. Jung	833
<b>Research on Stable Forming of Titanium Alloy Bar Using Three-Roll Skew Rolling</b> G.X. Huang, B.S. Sun, W.F. Peng, X.D. Shu and W. Lu	837
<b>Research Progress in Technology of Diamond Cutting Tools</b> Y.D. Zhou, G. Ma and X.D. Chen	842
<b>Simulation on the Temperature Field of Milling Roller Using Fluent Software</b> M. Wang, K.P. Zhang and F.W. Zhang	846
<b>Simulation Study on the Force of Particles Migrating in Molten Metal under High-Frequency Magnetic Field</b> H.M. Wang, C.C. Qu, X.J. Fan and G.R. Li	851
<b>Springback Analysis of Thin-Walled Stainless Steel Bellow in Hydroforming</b> J. Liu, Y. Liu, L.Y. Li, X. Li, S.F. Yang, Y.H. Geng and F.Y. Liu	855
<b>Study on the Microstructure and Property for T-Joints of Al-Li Alloy Welded by Double Sided Synchronization Fiber Laser</b> E.G. He, L. Chen and M.T. Wang	859



<b>Study on Tool Wear in Green Milling Ni-Based Superalloy</b> H. Wang, Y. Lu and J.J. Liu	865
<b>Study on Welding-Seam Characteristics and Formation of Tailor-Welded Blanks with Big Unequal Thickness</b> X.G. Li, R. Jin, Y.Q. Zhang, L.X. Liu, J.Q. Zhang and A.M. Zhao	869
<b>The FEM Analysis for Feed Rate of Plate Multi-Point Composite Incremental Forming</b> G.P. Cai, X.L. Zhou and Y. Xiong	874
<b>The Influence of Metal Surface Roughness on Bonding Strength of Metal and Composite Material</b> R. Yang, X.S. Xu and K.Z. Li	879
<b>The Research on Diameter Growth of Deep Groove Ball Bearing Inner Ring in Cold Rolling Process</b> B.S. Sun, G. Feng, X.D. Shu, L.T. Qi and S. Pang	883
<b>The Research on the Generated Mechanism about the End Concavity of Shaft in the Closed Type of Cross Wedge Rolling</b> J.D. Ma, C. Shu, B.S. Sun, C. Chao and C. Cheng	888
<b>Velocity Control with SGARC 440 Alloy in the Roll Forming Process</b> Y. Zhang, D.H. Kim and D.W. Jung	894
<b>Simulation of the Surface Roughness by End Face Grinding Wheel with Ordered Abrasive Pattern</b> X.S. Li, M.L. Shao, J. Wang and Y.S. Lu	898
<b>Effect of Different Methods on Properties of SMA490BW Steel Welded Joints</b> X.Y. Wu, W.C. Qi, Y.J. Liu, Y.B. Han and C.H. Xia	902
<b>Microstructure and Mechanical Properties of Electron Beam Welded 5A90 Al-Li Alloy</b> B. Lin, L. Chen and D.H. Cheng	906
<b>Study on the Microstructure of Thermoforming</b> J. Wu, H.Q. Guo and D.S. Bi	911
<b>Study on Typical Metal Forming Pattern of Ultrasonic Vibration Assisted Upsetting Process</b> X. Wu, X.Q. Xia, G.Q. Shen, F. Li and S.X. Yang	915
<b>Finite Element Simulation for Laser Deposition Process of Graphite Copper Gradient Composite of Thermal Stress</b> L.Z. Zhao, P.W. Chen, D.Y. Li, M.J. Zhao and J. Zhang	922
<b>Numerical Simulation of Distribution Characteristics of Electromagnetic Field for Round Billet with Mold Electromagnetic Stirring</b> X. Li and Z.H. Jiang	927
<b>Effect of Load Direction on Failure of Out-of-Plane Composite Joints</b> Y.L. Chen, K.K. Wang and X.X. Zhang	934
<b>Research on the Low Cycle Fatigue Properties of PC/ABS Blend</b> M.H. Ho, P.N. Wang and S.C. Kuo	938
<b>Effect of Equal-Channel Angular Pressing Passes on Corrosion Behavior of Ultrafine-Grained Pure Iron</b> L.Y. Zhang, A. Ma, J.H. Jiang, H.S. Wu and H.B. Yu	942