

Table of Contents

Preface and Organizers

Advanced Processing of Materials

Effect of Strontium and T6 Heat Treatment on Structure and Performance of Al-11.6Si-0.5Mg Alloy J.X. Lin, J.P. Zhang, L.Y. Niu, D.R. Sun, Z.M. Shi, Y. Li and G.Y. Li	1
Microstructure and Precipitates of High-Pure Ferritic Stainless Steels Stabilized by Niobium and Titanium H.P. Wang, B. Peng, L.F. Sun, C.J. Liu and M.F. Jiang	7
Experimental and Numerical Study on Dieless Bending of 2-Piece Parallel Flow Microchannel Heat Exchanger Z. Wang, Z.W. Zhang, D.Y. Li and Y.H. Peng	13
Preparation of Tungsten-Copper Composite Powder by Electroless Plating Y. Wang, J.T. Zou and Q.H. Zhang	28
Effect of Coil Temperature on Microstructure and Texture Evolution of an High Strength Nb-IF Steel Sheet Y.B. Xu, Z.Y. Hou, H.L. Yi, D. Wu and G.D. Wang	35
Analysis of Density and Mechanical Properties of Iron Powder with Upper Relaxation Assist through High Velocity Compaction D.F. Khan, H.Q. Yin, M. Matiullah, A. Asadullah and X.H. Qu	41
Effect of Addition Zr on As-Homogenization Microstructures of 5182 Aluminum Alloy B.H. Jin, B.H. Zhu and X.W. Li	47
Research on Characteristics of Heat Treatment of Squeeze Cast Al-Cu-Mg Alloy Y.Q. Gan, L. Lu, D.T. Zhang, W.W. Zhang and Y.Y. Li	54
Effects of SPS Pulse Current on Interface of Al₉₀Mn₉Ce₁/ZrO₂ Micro-Cellular Structure Composites Z. Zan, M.G. Wang and Z.K. Zhao	61
Effect of Process Parameters on Hydroforming of Stainless Steel Tubular Components with Rectangular Section Y. Xu, S.H. Zhang, Q.X. Zhu, M. Cheng, H.W. Song and G.J. Zhang	67
Effect of Annular Electromagnetic Stirring on Microstructure and Mechanical Property of 7075 Aluminium Alloy Z.H. Gao, J. Xu, Z.F. Zhang and M.O. Tang	75
Research on Dieless Drawing Process of Stainless Steel Tapered Tube X.F. Liu, Y. Zhang, F. Qin, H.E. Mao and J.X. Xie	82
Hot Deformation Behavior of A390 Hypereutectic Al-Si Alloy X.G. Hu, B.C. Yang, J. Xu and H.J. Wang	88
Numerical Simulation of Electro-Slag Remelting Process Solidification Structure of Cr-Co-Mo-Ni Bearing Steel L.G. Bai, M.S. Yang and J.S. Li	96
Influence of Extrusion Temperature on Microstructures and Properties of Cu-17Ni-3Al-X Alloy W. Yan, Y.H. Weng, Z.Q. Luo and W.W. Zhang	105
The Effects of Rolling Process on the Microstructure and Properties of Columnar-Grained Cu-12 Wt%Al Alloys J.L. Liu, H.Y. Huang, X. Xu and J.X. Xie	112
Influence of Different Pouring Temperature to Properties and Organization of A356 Aluminum Alloy under Specified Conditions L.L. Zhao, L.M. Yang and T.T. Zhou	119
Numerical Simulation Analysis of Aluminium Alloy Wheels Casting Defects and Casting Process Optimization L.M. Yang, L.L. Zhao, Q.Q. Zhang and T.T. Zhou	125
Effect of Compound Fluxes on A-TIG Welding Joint Depth of Cu-Cr-Zr Alloy W.H. Jiang, R.D. Yu and S. Lu	133

Fabrication and Properties of Cu/MgB₂ Composites by Vacuum Sintering Q. Yang, J.T. Zou, Z. Liu and X.J. Yu	141
Research Progress of Cold Working Die Steel X.L. Ni, G.Q. Zhang and Y. Zhang	145
Effect of High Density Pulsing Current on Mechanical Properties of Fe-6.5wt.%Si Alloy Sheet H.C. Zhou, Y.F. Liang, F. Ye, G.Y. Tang and J.P. Lin	151
Effect of Mixing Method on Microstructure of SiCp/Al Composites H.Q. Cao, Z.M. Guo, W.W. Yang and J. Luo	157
The Intelligent Control Method of the Density of the Metal Injection Molding Billet Based on ANN Z.S. Zheng and R.R. Leng	161
Study on the Interface Diffusion Bonding of the Copper Alloy/30CrMnSi Steel J.T. Zou, Y.F. Liu, L. Pei, X.H. Wang and S.H. Liang	168
Effects of TIG Process on Corrosion Resistance of 321 Stainless Steel Welding Joint D. Hu, S.L. Li and S. Lu	173
Microstructures and Mechanical Properties of Mg Alloy FSW Joint Characterized with Asymmetric Gradient in Three Dimension S. Lu, D.L. Yang, S.Y. Xiao and A. Lu	180
Cryogenic Treatment of 06Cr19Ni10 Austenitic Stainless Steel H. Zhang, K.X. Gu, J. Guo, X.D. Xue and J.J. Wang	187
Magnetic Properties and Morphology of the Cobalt Particles Prepared in Different Liquid Solvent X.M. Huang, Q.S. Wang, Y. Liu, X.C. Zhao and S.L. Wen	192
Effects of In/Ce to Sn-3.5Ag Lead-Free Solder on Microstructures and Properties E.J. Chen, X.C. Zhao, Y. Liu, D.M. Li, J.W. Cheng and H. Li	198
Preparation and Mechanism of Cu/Nano-TiO₂/PBO Composite Fibers by Photocatalysis Electroless Plating Y.Y. Luan, X.F. Liu, Z.N. Peng and J.X. Xie	205
The Study on the Reducing Friction and Anti-Wear Performance of Zinc Phosphate Nanoparticles as Lubrication Additives Y.X. Lv, X.C. Zhao, J.W. Cheng, Y. Liu and H. Li	211
Fabrication of Lotus-Type Porous Silicon by Unidirectional Solidification in Pressurized Hydrogen Atmosphere Q.Q. Yang, Y. Liu and Y.X. Li	217
The Microstructural Evolution of AA6111 Aluminum Alloy during Homogenization Treatment S.J. Zhang, B.Q. Xiong, Y.A. Zhang, X.W. Li, F. Wang, Z.H. Li and H.W. Liu	223
The Surface Heat Transfer Coefficient Model of 7075 Al-Alloy Extrusion Product and its Temperature Prediction W.R. Hou, W.B. Ji, Z.H. Zhang and J.X. Xie	229
Isothermal Bainite Transformation in Aluminium Bearing TRIP Steel P. Chen, Y.B. Xu, X.L. Yang, H.L. Yi and G.D. Wang	237
Effect of Cooling Paths on Microstructure and Mechanical Properties of Vanadium Bearing Microalloyed Steel J. Chen, X.W. Chen, S. Tang, Z.Y. Liu and G.D. Wang	243
The Influence of Inhomogeneous Deformation on the Microstructures and Properties of Thick-Plate 7150 Alloy F. Zhao, L.Y. Cao, Y.J. Lang, H. Cui, L.Z. Zhuang and J.S. Zhang	250
Thermal and Optical Properties of High Refractive Index xNb₂O₅-(1-x)La₂O₃ Glasses Prepared by Aerodynamic Levitation Method Y.X. Cheng, G.S. Xu, J.D. Yu, X.H. Pan, M.H. Zhang and Y. Liu	255
Effect of Heating Temperature and Heating Rate on Austenite in the Heating Process of 300M Steel Y.G. Liu, M.Q. Li and X.L. Dang	260
The Metal Flowing Behaviors and Die Bearing Band Optimization of a Large Al-Alloy Extrusion Profile D.N. Huang, Y. Ning and F.L. Shao	268

The Dynamic Recrystallization Model of 7050 Al-Alloy during Hot Deformation Z.H. Zhang, W.R. Hou, Q.H. Pang and J.X. Xie	274
Effect of Heat Treatment on Microstructure and Properties of Cu-3Ti-1Al Alloy X.H. Wang, X.C. Sun, X.H. Yang and S.H. Liang	282
Effect of Q-P-T Process on the Microstructure and Mechanical Properties of 300M Steel R.W. Zhao, T.Q. Liu and X.Q. Zhao	287
The Precipitation and Strengthening Mechanism of Cu-Ni-Si-Co Alloy Q.S. Wang, G.L. Xie, X.J. Mi, B.Q. Xiong and X.P. Xiao	294
Energy Saving by Applying 3000kVA Electric Arc Furnace in Fused Magnesia Production G.C. Qi, F.J. Shan, Q. Li and J.Y. Yu	299
Effect of Partitioning Time on the Microstructure and Mechanical Properties of Q&P Steels K.K. Ren, Y.L. Kang and S. Zhu	303
Effect of Different Concentrations of Sodium Silicate Impregnated on the Performance of Carbon/Copper Composites H.J. Yang, H.P. Wang, B. Tang and J.W. Qiao	308
W-Ti Alloy Prepared by Hydrogen Reduction of Nanometer WO₃-TiH₂ Powders P. Xiao, Y.C. Qu, X.H. Yang and S.H. Liang	316
Investigation on the Preparation and Properties of MoCu Gradient Material X.H. Yang, N.N. Zhang, P. Xiao and C.Y. You	322
Grain Evolution Character of Discal Parts by Roll Forming Q.L. Jin	328
Influence of Sulfur and Manganese Contents on Texture and Fish-Scale Resistance of DC03EK Cold-Rolled Enamel Steel F.T. Dong, L.X. Du, X. Liu and J.M. Jiao	337
Microstructure and Mechanical Properties of AZ81 Magnesium Alloy after Unequal Channel Angular Pressing X.P. Luo, M.G. Zhang and J.Q. Zhou	343
Microstructure Evolution in Undercooled Ni-Si Melt K. Fan, F. Liu, B.Q. Fu, W.Z. Luo and Y.H. Zhou	349
Effect of Technological Parameters on Preparation of Mg-Based Foam Materials H.J. Luo, L. Zhang, Z.G. Xu and Y.S. Yang	356
Influences of High-Temperature Short-Time Endurance Performance of Heat Resistant Steel for Ultra Supercritical Units H. Tang, F. Xiao, J.S. Ding and Z.H. Li	361
Preparation and Heat Treatment of Ni60-WC/Cr12MoV Bimetallic Composite Materials Y.Q. Cao, Y.T. Lv, P. Jang and J.F. Xu	366
Tungsten-Copper Composite Fabricated by Hot-Shock Consolidation Q. Zhou, P.W. Chen and D.Z. Ma	372
Investigation of Debinding and Sintering of 3Y-ZrO₂ Gear Fabricated by Micro Powder Injection Molding L. Liu, Y. Chen, X.L. Ni, H.Q. Yin and X.H. Qu	378
Softening Mechanism in Heat Affected Zone of 2519 High Strength Al-Cu Alloy C.G. Yang, Q. Zhen, Z.J. Huang and W.P. Xu	387
Research on Preparation Technology of High Quality Diamond Film C.G. Zhou, R. Qiu, J.L. Ke, C.L. Liu and B. Wang	392
Effects of Strain Rate on Tensile Deformation Behavior of Quenching and Partitioning Steel C. Liu, L. Wang and Y. Liu	401
Effect of Composite Master Alloy on Mechanical Properties and Electrochemical Corrosion of ZL101 Alloy H. Xu, X. Zhang, J.P. Ren, M. Peng, S. Yang, Y.L. Zhang and K.Y. Kong	407
Heat Transfer Performance of Lotus-Type Porous Copper Micro-Channel Heat Sink H.F. Chen, Y. Liu, L.T. Chen and Y.X. Li	414
Effect of Alternative and Homogenization on the Microstructure of Cu-20Ni-5Sn Alloy W. Cai, S.L. Yang, L. Chen, M.M. Lu and Y.M. Liao	421
Properties and Fabrication of Alumina Dispersion Strengthened Copper Alloy with High Softening Temperature S.L. Han, X.D. Qin, Y.X. Cai, K. Luo, H.W. Xie and D.R. Li	425

Materials Modeling and Simulation

Magnetic Properties for Magnetic Quantum Dot Arrays: Fast Fourier Transformation and Micromagnetism Study

Q.Y. Ye, S.Y. Chen, K.H. Zhong, X.L. Chen and Z.G. Huang 432

Analysis and Simulation of the UOE Pipe Production Processing by Finite Element Method

Y. Zhao, Q. Ren, T.X. Zou, D.Y. Li and Y.H. Peng 437

The Kinetics of Reorientation of Multi-Variants under the Continuous Tensile Stress: Phase-Field Simulation

J.F. Wan, J.H. Zhang and Y.H. Rong 444

The Probabilistic Safety Assessment of the Rail Mounted Gantry Cranes

Y.B. Zhang, Y.Q. Li and H.Y. Luo 450

Size Dependent Mechanical Properties of Graphene Nanoribbons: Molecular Dynamics Simulation

Y.J. Sun, F. Ma and K.W. Xu 456

The Effect of the Size and Electronic Factor on Occupation and Magnetic Property of Co Addition in L10 FePt Alloy

X.L. Shu, Y.F. Jia and Z.Y. Chen 461

First-Principles Study on the Thermodynamic Properties of Nb, Cr₂Nb and Nb₅Si₃ Alloys

Z.Q. Yang and J.X. Shang 466

Research on the out of Square of H-Beams

X.M. Zhao, F. Guo, X. Gao, W.Z. Xia, L.N. Wang and D. Wu 473

Atomic Modeling and Simulation of AlCoCrCuFeNi Multi-Principal-Element Alloy

S.Q. Wang 479

Influence of Deformation and Quenching Temperature on Structures and Properties of High Nitrogen Stainless Bearing Steel

S.J. Zhang, M.S. Yang and T. Lei 484

Precipitate Behavior and Microstructure Evolution of γ' Phase in Ni-Al Alloys with the Internal Elastic Strain

X.L. Cheng, Y.S. Li, L. Zhang and H. Zhu 491

Research on Flow Behavior of Advanced High Strength Steel at Elevated Temperature

C.X. Lei, J.J. Cui, Z.W. Xing and H. Zhao 498

Simulation and Technology Optimization for Rolling Web Wave of Large Size H-Beam

X.Y. Guo, G.M. Zhu and Y.L. Kang 504

Indenter Size Effect on the Incipient Plasticity of Al (001) Surface

Y.F. Shao, D. Tang, J.H. Li and X. Zhao 510

Prediction and Simulation of Microstructure-Property and Residual Stress for Large Size Hot Rolled H-Beam

G.M. Zhu, Y.L. Kang and X.Y. Guo 518

Theoretical Calculation of Electronic Structure and Mechanical Properties of Quenched Carbon Structural Steel

Y.J. Sun, S.N. Li, H.F. Shi, Z.Y. Gao and S.B. Yang 528

Computational Modeling of Sand Cementation by Bio-Mineral CaCO₃

L. Li, C.X. Qian, Y.H. Zhao and Y.T. Zhu 535

Generating 2D Non-Equiaxed Initial Microstructure for Monte Carlo Simulation Using Modified Voronoi Model

Y.T. Liu, J.X. Zhou, C.W. Tian, C.W. Zhan, W.H. Li and X.J. Guan 540

A New High Order Mathematical Model for Calculating the Energy Conservation Equation

X.F. Niu, W. Liang, H. Hou, Y.H. Zhao, H.X. Wang, C.X. Xu, J.S. Zhang and W.L. Cheng 545

Optical Properties of Heterodiamond BC₃ from First-Principles

L. Li, W.X. Li, D. Han, S.W. Xin, Y. Yang, W. Zhou and Y.F. Lu 551

Numerical Simulation on Electric Field of Galvanic Corrosion for U-Nb Alloy and 45-Steel

P. Dong, Z. Pu and M.B. Shuai 556

Effects of N Concentration on Electronic Structure and Optical Absorption Properties of N-Doped SrTiO₃ from First Principles

C. Zhang, Y.Z. Jia, Y. Jing, Y. Yao, J. Ma and J.H. Sun 561

The Clustering of Zn₆Y₉ and its Predominant Role in Long Period Stacking Order Phases in Mg-Zn-Y Alloys: A First-Principles Study S.Y. Ma, L.M. Liu and S.Q. Wang	569
Development of Thermodynamic Database of Ti-V-Based Hydrogen Storage Alloys J. Wang, M.H. Rong, C.Y. Tang, G.H. Rao and H.Y. Zhou	577
Materials Surface and Interface	
Effects of La₂O₃ on Microstructure and Properties of Laser Clad Fe-Based Amorphous Composite Coatings Q.L. Lu, Y.F. Wang, L.J. Xiao, X.M. Li, Z.G. Yu and Z.Q. Shi	583
Interfacial Behavior of Micro-Cellular Structural Al₉₀Mn₉Ce₁/TiO₂ Composite Prepared by Spark Plasma Sintering N. Deng, M.G. Wang and Z.K. Zhao	589
Wear-Resistant Coatings Prepared by Combination of SHS and Lost Foam Casting T. Shi, Z.M. Guo and L. Gao	595
Formation Sequence of Interface Intermetallic Phases of Cold Rolling Cu/Al Clad Metal Sheet in Annealing Process L. Yang, B.X. Mi, L. Lv, H.J. Huang, X.P. Lin and X.G. Yuan	600
Galvanic Corrosion between Depleted Uranium and 45 Steel Z. Pu, Q.F. Wang, M.B. Shuai and D.M. Lang	606
Surface Stability of a Biaxially Pre-Tensioned Soft Elastic Film Interacting with a Contactor L. Qiao and L.H. He	611
Preparation of 8YSZ and Double-Ceramic-Layer La₂Zr₂O₇/8YSZ Thermal Barrier Coatings on GH4169 Superalloy Substrates and their Static High Temperature Oxidation Behaviour L. Wang, Y. Wang and X.G. Sun	617
Study on the Electrolysis Expansion of Carbon Cathode in [K₃AlF₆/Na₃AlF₆]-AlF₃-Al₂O₃ Low Temperature Melts Z. Fang, P.F. Xu, J. Xu, L.B. Li and J. Zhu	633
Effect of Deposition Temperature on the Structure and Mechanical Properties of Ti-6Al-4V Film L. Li, Y.F. Lu, W.X. Li, L.Y. Zeng, Y. Yang, Z.M. Hou and D. Han	643
The Effect of Strain on the Impedance and Surface Potential of Austenite in 304 Stainless Steels J.P. Xie, H.Y. Luo and J.L. Lv	648
Preparation and Characterization of the Highly Regular Nitrogen Doped Anatase TiO₂ Nanotube H.B. Li, J.L. Li, Y.X. Wang and L.P. Wang	654
Impact on Solidification Dendrite Growth by Interfacial Atomic Motion Time with Phase Field Method Y.H. Zhao, W.J. Liu, H. Hou and Y.H. Zhao	660