

Table of Contents

Preface

Part 1 Eco-Materials

Exergy-Based Model of the Depletion of Mineral Resources B.X. Sun, Z. Nie, Y. Liu, Z.H. Wang and X.Z. Gong	1
Analysis of Influencing Factors of CO₂ Emissions from Integrated Steelworks Based on LCA Z.J. Huang, X. Ding, H. Sun and S.Y. Liu	9
Preparation and Design of Function Aggregate in Concrete S. Hu, T. Yang, F. Wang and J. Wang	17
Synthesis and Characterization of TiO₂ Nanoparticles Doped with Cu²⁺ by Microemulsion Method J.X. Long and Y.J. Chen	23
Properties of Linear Polyaspartic Polyurea Coated Concrete under NaCl Solution Immersion and Co-Action of Load and NaCl Solution Immersion P. Lu, W.B. Huang, H. Shi and L. Zhu	28
Effect of Curing Temperature on Morphology and Properties of Polyureas Based on Polyaspartic Esters P. Lu, W.B. Huang, H. Shi and L. Zhu	33
Study on Chloride Diffusion in Concrete with Non-Homogenous Coefficient Using Meshless Boundary Element Method L. Guo, T. Chen, J. Hong, L. Qiao and X.M. Guo	38
A Novel Constitutive Model for Concrete under Uniaxial Compression J.L. Pan, J.J. Zhou, Z. Li and C.K.Y. Leung	47
3D Dynamic Simulation for Random-Distributed Aggregate Model of Plain Concrete J. Hong, L. Guo, L. Qiao and X.M. Guo	56
Mechanical Properties and Microstructure Characterization of Calcium Silicate Hydrate (C-S-H) Gel L. Qiao, L. Guo, J. Hong and X.M. Guo	63
Investigation on Toughness of Fibre Cocktail Reinforced Self Consolidating Concrete after High Temperature Y.N. Ding, Y.H. Wang and Y.L. Zhang	67
Effect of Ag Particles on Wettability and Creep Rupture Life of SnCu Based Composite Solders Y.F. Yan, G.X. Wang, K.X. Song and K.L. Zhao	78
Synthesis of a New Semiconductor Compound [(C₅S₅H₃CH₂O)₄Ni](FeCp₂)_{0.84} Y.B. Zhang, T. Zhang, X.L. Yang, W.T. Zhang and X.J. Wang	85
Sn-2.5Ag-0.7Cu-0.1Re-xNi Lead-Free Solder Alloy and its Creep Properties of Solder Joints K.K. Zhang, Y.L. Wang, Y.L. Fan, G.J. Zhao, Y.F. Yan and X. Zhang	91
Cu-Ni-Ti Composite Diffusion Coating on Si₃N₄ Ceramic Surface H.X. Zhang, Y.H. Wei and W.X. Wang	97
Effects of Barium Substitution on the Structure and Properties of PSZT Piezoelectric Ceramics Y.H. Feng, T.Z. Pan, X.Q. Shen, H.J. Song and L.P. Guo	103
Effect of Healing Temperature on Crack-Healing of Al₂O₃ Toughened by SiC Particles C.Y. Shi, Y.K. Guo, S.J. Zhao and C.M. Song	109
The Research and Development of Novel Magnetic Material and Magnetic Core Used in Planar Transformer J.Y. Lou, J. Wang, Y.T. Chen and L. Gao	115
Effect of La₂O₃ Content on Mechanical Properties and Toughened Mechanics of SiC Nanowires Toughened C_w/SiC Composites Y.L. Zhang, Y.M. Zhang and J.C. Han	119

Part 2 Energy Materials

Vacancy Phonon Scattering and Thermoelectric Properties in In₂Te₃–SnTe Compounds H. Fu, P.Z. Ying, J.L. Cui, Y.M. Yan and X.J. Zhang	126
Effects of Ag Addition on High Temperature Thermoelectric Properties of (Ca_{0.9}Gd_{0.1})₃Co₄O₉ Ceramics Y. Lu, Y. Song, J. Feng and F.P. Wang	132
Effect of FAPAS Process on the Thermoelectric Properties of β-FeSi₂ Q.S. Meng, W.H. Fan, L.Q. Wang and L.Z. Ding	137
A Simple Way of Pre-Doping Lithium Ion into Carbon Negative Electrode for Lithium Ion Capacitor F. Wu, H.Q. Lu, Y.F. Su, S. Chen and Y.B. Guan	142
Phase Structure and Hydrogen Storage Characterization of the As-Cast Mg-10Ni-2Mm Alloy N. Xing, P.C. Bai, Y. Wu, Z.C. Lu, W. Han and S.X. Zhou	150
Microwave-Assisted Synthesis of Antimony Oxide Nanostructures and their Electrochemical Properties F.D. Wu, Y. Wang and J.J. Tang	157
Effects of Power on Properties of ZnO:Al Films Deposited on Flexible Substrates by RF Magnetron Sputtering X.J. Wang, Q.S. Lei, J.M. Yuan, W.L. Zhou and J. Yu	163
A Simple and Low Cost Approach for Texturing on CZ-Silicon Solar Cell X.F. Gou, X.D. Li, Y. Xu, S. Song, Y.F. Cui and H.Y. Fan	168
Degradation Behavior of MgB₂ Powders in Different Medium Environment H. Zhu, S.M. Wang, Z.N. Li, X.P. Liu and L.J. Jiang	172
Effects of Phosphorus on Laves Phase Dissolution and Elemental Diffusion in GH706 Alloy X. Xin, W.R. Sun, S.R. Guo, F. Liu, F. Qi, S.H. Zhang, H.C. Yang and Z.Q. Hu	178
Hot Deformation Behavior and Mechanism of Alloy Inconel 625 Q.J. Yu, W.R. Sun, M. Cai, X.J. Wu, S.R. Guo, H.C. Yang and Z.Q. Hu	186
Variation of the Reversed Austenite Amount with the Tempering Temperature in a Fe-13%Cr-4%Ni-Mo Martensitic Stainless Steel Y.Y. Song, X.Y. Li, F.X. Yin, D.H. Ping, L.J. Rong and Y.Y. Li	193
Effect of W on Deformation Resistance of Co-Bearing 12Cr Ferrite Heat-Resistant Steel for USC Steam Turbines H.R. Cui, F. Sun, L.T. Zhang, A.D. Shan and J.S. Wu	199
Effects of Long-Term Aging at 1070°C on Microstructure and Mechanical Properties of Ni₃Al-Base Alloy IC6E M. Li, J.X. Song, S.S. Li and Y.F. Han	205
Oxidation Behaviour of MCrAlY and MCrAlY +ZrO₂ Coatings on Ni-Based IC6 Superalloy D. He, S.S. Li and Y.F. Han	210
Effects of Conical Transition Section on Microstructure of a Ni₃Al-Base Single Crystal Superalloy IC6SX L.W. Jiang, S.S. Li and Y.F. Han	214
Effect of Welding Parameters and Post-Weld Heat Treatment on the Cracking Sensitivity of Weldments in Electron Beam Welded Rene 41 with Incoloy907 X.L. Li, Y.M. Liang, W.J. Kang, H.X. Li and C.L. Ma	219

Part 3 Light Metals and Alloys

Study on the Formation Mechanism of Micro-Arc Oxidation Coatings on Magnesium Alloys X.M. Chen, C.P. Luo and J.W. Liu	228
Effect of Ti Content on Hydrogen Storage Properties of Amorphous MgNi Alloy S. Gao, J.F. Wang, P.D. Ding, F.S. Pan and A. Tang	234
Application of Regression Analysis to Optimize Hot Compaction Processing in an Indirect Solid-State Recycling of Mg Alloy T. Peng and Q.D. Wang	239
Phase Diagram Calculation and Experimental Study on the New Type Mg-Al-Zn-Ca-Sr Alloy in the Mg-Rich Region S.Q. Luo, A. Tang, F.S. Pan, Y. Chen and Z.X. Feng	246

The Study of Interfacial Reactions and Mechanics Properties for Die Casting (Al₆₃Cu₂₅Fe₁₂)p /AZ91 Composites X.P. Li, Z. Xu and Y. Yu	253
An Electrochemical Method for the Preparation of Al-Mg Master Alloys from MgO D.L. Cao, J.K. Wang, S.C. Guo, Q.H. Fang and Z.N. Shi	260
Study to Microstructure and Mechanical Properties of Mg Containing High Entropy Alloys R. Li, J.C. Gao and K. Fan	265
SCC (Stress Corrosion Cracking) Behaviors of Mg-7Al Alloy Y. Zhang, X.H. Zhou, Z.L. Wei and Y.W. Huang	272
Effects of Yttrium Addition on Microstructure and Mechanical Properties of Extruded Mg-Zn-Y-Zr Magnesium Alloys M.B. Chen, F.S. Pan, J.F. Wang, J. Peng and A. Tang	279
Effects of Particle-Reinforcement on Elastic Modulus of Metal-Matrix Composites J.Y. Huang, Z.H. Ling and G.Q. Wu	285
Formation and Mechanical Properties of Mg-Cu-Al-Gd Bulk Metallic Glass Composites Y.M. Wang, L.J. Zheng and S.J. Pang	290
Dynamic Recrystallization of 7055 Aluminum Alloy during Hot Deformation L.M. Yan, J. Shen, J.P. Li, Z.B. Li and Z.L. Tang	295
Preparation and Microstructure Analysis of Ti-Al Sheet by Electron Beam Physical Vapor Deposition Y.J. Zhao, L. Ma and X.D. He	302
Study on Tensile Fractured Surfaces and Toughening Mechanism of Ti/Ti-Al Micro-Laminate Sheet L. Ma and Z.H. Hu	308
Thermal Properties of the FCC Al₃Zr : First-Principles Study D.L. Li, P. Chen, J.X. Yi, B.Y. Tang, L.M. Peng and W.J. Ding	313
Preparation and Mechanical Property of Super-Light Aluminum Foam Z.K. Cao, J.J. Du and G.C. Yao	320
Molecular Dynamics Investigation of Relaxation and Local Structure Changes in a Quenched Molten TiAl Alloy Film L. Zhang, Q.N. Fan, C.B. Zhang and S.Q. Wang	324
 Part 4 Low Dimention and Amorphous Materials	
Study on Growth of Carbon Nanotubes by Using Modified Bentonite as Catalyst J.G. Zheng, Q.S. Chen, X.D. Liu and T. Yang	330
Study on the Mass Transfer Process in Pan Wet-Spinning B.H. Ji	336
Microstructure and Properties of Pure Mg/ZK60 Laminate Processed by Accumulative Roll Bonding C. Xu, M.Y. Zheng, H. Chang, X.S. Hu, K. Wu, W.M. Gan and H.G. Brokmeier	343
The Mössbauer Spectrum Research of the Lanthanon Compound Tb₃Fe_{29-x}Cr_x H.L. Liu, M. Huang and Q. Feng	347
The Influence of Degree of Polymerization on Precursor-Derived Si-B-C-N Ceramics X. Geng, X. Huang, Y.J. Li, S. Li and X.B. Shi	355
The Formation and Morphology of PVA Ferrogel Nanofibre by the Electrospinning Process T.Y. Wan, M. Chowdhury and G.K. Stylios	361
Effect of High-Dispersed Nano-ZnO on the Properties of Vulcanized Natural Rubber L. Li and L. Liu	367