

Table of Contents

Preface and Organizing Committee

Chapter 1: Metals and Alloys

Study on Impacts of the Power Spinning Process on the Properties of Hastelloy C-276 Z. Zhang	3
Research of Cladded Layers Structures Changes Created by Laser Beam Technology Using a Wire Filler Material B. Šimeková, I. Kovaříková and E. Hodúlová	9
70-150µm Dust Particles on the Reliability of Electrical Contact in Static Conditions Q. Yin, S.C. Liu and L.J. Xu	13
150-212µm Dust Particles on the Reliability of Electrical Contact in Static Conditions Q. Yin, S.C. Liu and L.J. Xu	17
Study on Spheroidization of Niobium Powders by RF Plasma Processing J.J. Wang, J.J. Hao and Z.M. Guo	22
Effect of Channel Inner Angle on Aluminum ECAP Plastic Deformation J.H. Li, Z.J. Yu and L.P. Zhang	27
Effect of Heat Treatment on Dendritic Microsegregation of an Al-Cu-Si Alloy G.W. Zhao, Z.M. Shi, X.C. Ye and W.J. Liu	32
The Application of Enhanced Cooling Technology to Grinding Process K. Ma	36
Effect of Strontium on Structure and Property of ZL102 J. Wang, G.S. Cai, H.F. Lu, Y.H. Jiang, R.F. Chen and L. Wu	40
The Study on TiAl Based Alloy Blade Casting Structure by Bottom Pouring Vacuum Suction Casting X.C. Ye and W.G. Zhao	44
Research on Improving the Gilding Quality for Electric Connector Contacts Made by Copper Alloy S.Q. Xu and X. Liu	48
The Impact of Grinding on Surface Integrity of Powder-Metallurgy High-Speed Steel (S390) S.H. Mu, C.L. Cao, X.L. Zhang, Z. Xiang and X. Mao	52
The Effect of Annealing Temperature on the Properties and Second-Phase Particles of 0.4mm Galvanized Ti-IF Steel F. Li, J.S. Lv, H.G. Yang, F. Zhou, L. Zhang and E.D. Wang	58
The Effect of Composition and Microstructure on Corrosion Behavior in SST of Zn-Al-Mg Galvanized Steel Sheet F. Li, J.S. Lv, H.G. Yang, F. Zhou, L. Zhang and H.K. Wang	64

Chapter 2: Applied Materials in Industry

Research on Absorbing Property of Cement-Based Material Blending with Graphite and Carbon Fibers Y. Zhang, B. Wang and X.H. Wang	73
Characteristics of Metal/Composites Bi-Material Tube Beam under Axial Impact Loading C.K. Hee, K.S. Dong, C.S. Kum, W.J. Ju and J.J. Lee	78
Experimental and Numerical Simulation of Absorbing Property of Cement-Based Material Blending with Nano-TiO₂ and Steel Fibers B. Wang, Y. Zhang and R.J. Chen	83
Synthesis of Tetragonal BaTiO₃ Powders via Alkoxide Method Assisted by Diethanolamine Y.T. Li, K.H. Qiu, Y.C. Qiu, H. Zhong and N.J. Fu	88
Characterization of Zeolite/Monomer Casting Polyamide 6 Composites B.F. Huang, H.X. Liang, Z.Y. Li and Y.C. Bai	94

Study on Preparation Method and Energy-Absorbing Characteristics of Carbon Fiber Composite Energy Absorber	
C.J. Luo, H.L. Zhang, W.Z. Yu, K. He and R. Du	98
Lifetime Prediction of EPU/Al Low Infrared Emissivity Coatings in Damp Heat	
X.X. Yan, G.Y. Xu, Y. Wu and Z.H. Wu	104
The Wording of Ferrochrome in Copper-Based P/M Friction Material	
X. Zhao, J.J. Hao, X. Yu, K. Peng and Z.M. Guo	110
Effect of Deposition Power on the Structure Properties of Microcrystalline Silicon Thin Films	
J.W. Chen, L. Zhao, H.W. Diao, S. Zhou, G. Wang and W.J. Wang	116
Characterization of a Laccase from White Rot Fungus <i>Cerrena unicolor</i>	
B.B. Zhang, Y.J. Shen, C. Xu, Y. Li and M.H. Jiang	120
Compression Tests of Polycarbonate under Quasi-Static and Dynamic Loading	
W.J. Hu, X.C. Huang, F.J. Zhang and Y.M. Chen	125
Investigation of Texturing for Mono-Crystalline Silicon without IPA	
S. Zhou, C.L. Zhou, J.J. Zhu, W.J. Wang and J.W. Chen	129
Research into High Performance Zeolite/Monomer Casting Nylon 6 (MCPA6) Composites	
B.F. Huang, H.X. Liang, Z.Y. Li and Y.C. Bai	134
A Short Wavelength and Low Loss Thin-Film Transmission Line Employing ML/CPW Composite Structure on Silicon Substrate	
K.J. Son, J.H. Jeong, S.J. Han and Y. Yun	138
Comparison of Biomaterials from Essential Oils in Five Parts of <i>Magnolia sieboldii</i>	
G.R. Sun, F.G. Du and R.J. Wang	142
Effect of Antibiotic Additions on the Mechanical Properties of Bone Cement	
C.S. Wu, F.T. Chiang and J.P. Hung	147
The Characteristics of Metakaolinite-Based Geopolymer at Different Temperature	
J.Y. Chen, S. Tao, X.R. Lei and X.Y. Zhu	152
The Study on the Preparation and Properties of Sol-Gel Derived Antireflective Coating for Solar Glass	
Z.J. Li and Q. Chen	156
Study on Mechanical Behavior of Masonry Wall in School Building Reinforced by CFRP	
H. Lin, Z. Yang, X.W. Wang and X. Ke	162

Chapter 3: Energy Science and Engineering

Ray-Thermal Sequential Coupled Heat Transfer ANALYSIS of Porous Media Receiver for Solar Dish Collector	
F.Q. Wang	169
Fault Line Selection and Section Location of Distribution Network Based on S-Transform and Zero-Sequence Reactive Power	
N.H. Yu, R. Li, H.G. Cao, W.Q. Tao and C.J. Li	176
Exergy Analysis of Transcritical Regenerative Organic Rankine Cycle Using Isobutane	
K.H. Kim	183
Current Research Progress in Non-Classical Fourier Heat Conduction	
F.F. Wang and B. Wang	187
Emissions Effect of Gasoline and Ethanol Gasoline on Vehicle Exhaust CO/HC	
Q.H. Zhao, X.P. Wu and D.Z. Chen	197

Chapter 4: Manufacturing Science and Engineering

Development of Molding Tool with Augmented Reality Technology Application	
J. Novak-Marcincin	203
New Possibility of Visualization in Mechanical Engineering	
J. Novak-Marcincin, J. Torok and L. Novakova-Marcincinova	209
Studies on Impact Force Caused by Sloshing of New Type Water Transporting Tank on Basis of ADINA	
C.Q. Xu, G.Z. Jia, R.L. Gao and X. Gao	216

Development of Robotic Spraying System in Narrow Space Y. Chen, W.Z. Chen, K. Chen, J.Y. Shao and W.M. Zhang	221
The Influence of Spraying Angle on Robotic Trajectory Planning Y. Chen, W.Z. Chen, K. Chen, J.Y. Shao and W.M. Zhang	225
Finite Element Analysis for Gear Contact Based on UG and ABAQUS L.M. Wu and F. Yang	229
Optimization of Elevator Production Line in its Flexible Improvement by the Value Stream Mapping Tool W.J. Wu and G.J. Ye	233
Process of Shaking Ladles for Producing Ferroalloy J. Zhang, S.Q. Ni and S.J. Chu	238
Study on Tension Distribution Calculation Method for Strip Cold Rolling J.L. Bai and J.S. Wang	244
Structure Design Method of Multi-Ring Carbon Fiber Composite Flywheel X.L. Wen, X.C. Wang, T. Ke and J.G. Zhang	250
Reliability Analysis on Competitive Failure Processes under Multiple Failure Modes H.B. Hao and C. Su	257
Design of New Chain Transmission and Automatic Meshing Installation H.L. Hou and W.H. Gao	264
Study on High Strength Metal Cellular Automatic Forming Technology and Equipment L. Qin, W.L. Yue and C.J. Luo	269
Study on Quality Control of the Laser Welding Joint Q. Wu and L.Y. Xu	276
An Improved Bat Algorithm and its Application in Multiple UCAVs Y.G. Li and J.P. Peng	282
Structure Optimization for Hydraulic Press Based on Approximate Model W. Wei	287
Design and Test of a Mechanical Device for the Manipulator of the Watermelon Picking Machine J.H. Yu, L.J. Xu, K.F. Ren, W.P. Zhang, Z.G. Lu and P.D. Wang	291
A Robust Method of LED Die Recognition Based on Dual BP Neural Networks H.X. Li, T.N. Yang and X.X. Zheng	298
Key Technology in Wind Turbine Transmission System Condition Monitoring: A Review H.J. Dong, C.H. Zhao, S.Q. Wan, X.Y. Zhong and W. Wang	304
Electromagnetic Protection Method Based on Sorting Technique Y.Q. Zhang, L.S. Wu and B.X. Xu	311
Test and Research on the Machine Twining for Plastic Film Round Straw Bundle Cylinder R. Du, X.Q. Qi and X.C. Wang	315
The Motion Analysis of the Rehabilitation Main Motion Mechanism Y. Cai and D.K. Jiang	321
The Development of the Testing System of Mill Roll's Surface Morphology L. Wang	328
A New Design of Digital Camouflage Spray Device M. Chu, S.H. Tian and X.C. Pan	332
Analysis on Structure and Morphological of Carton Packaging A.Q. Sun	338
Influence of Moisture Content to the Freeze-Thaw Performance of Roadbed in High-Cold Areas Q.L. Wu, Y. Sheng and F. Xie	342

Chapter 5: Microelectronics and Embedded Systems

Frequency Conversion Type Ultrasonic Power Based on DSP Control Technology Research C.Y. Li, M.M. Jia and W.H. Wang	349
Research and Design for High Precision Ultrasonic Distance Measurement System H. Guo and S.W. Yu	354

Detection of Crack Travel and Opening of a Standard Notched Specimen Mode I Using Embedded FOS Device	
F.E. Utou, J. Gryzagoridis and B. Sun	360
A Design of WIFI Wireless Transmission Module Based on MCU	
X.H. Kuang and H.B. Huo	367
Automatic Measuring Instrument of Dam Horizontal Deformation Based on Laser Scan Concept	
J.Y. Lu and Y.F. Zhou	372

Chapter 6: Mechatronics

The Stability Analysis Based on EDF Scheduling Algorithm in CAN Bus	
Y. Liu	381
Driving Power Supply of Single-Chamber and Single-Vibrator Piezoelectric Pump	
Y.M. Sun, G.M. Cheng and P. Zeng	386
Vibration Characteristics Analysis for the Stator of Dynamic Friction Linear Piezoelectric Stack Motors	
X.F. Chen, Y. Liang, W.Q. Huang and H. Zhou	392
Method of Automobile-Sensitive Component of Safety Belt's Dimensional Inspection Based on Machine Vision	
B.J. Yu, M. Yang and G.Q. Zhao	397
Influence of Triggered Seed Bubbles on Flow Boiling in Microchannels	
L.X. Zong and J.L. Xu	405

Chapter 7: Automation and Robots

Research of Evolutionary Multi-Objective Optimization Algorithm Model Based on AIS	
M.S. Li, N. Wang and Z.H. Duan	413
A Kind of Evolutionary Multi-Objective Optimization Algorithm Based on AIS	
M.S. Li	419
Control System Design of Pneumatic Conveying in Sand/Dust Environment Simulation Test	
J. Yin, H. Liu, J. Wang and K. Li	424
DRNN Based Decoupling Algorithm of Self-Tuning Controller on Line	
B. Bi and X.Y. Yang	430
Coordinating Motion Planning for a Mobile Manipulator with Multiple Constraints	
Q.C. Li, W.S. Zhang, Y.H. Zhang, Y.D. Qiu and Y.H. Yang	437
An Efficient Heuristic Algorithm for Solving Crane Scheduling Problem	
X. Xie, Y.P. Li, Y.Y. Zheng and X.L. Li	443
A Workflow Management Model Based on Workflow Node Property	
N. Deng, X.D. Zhu, Y.N. Liu, Y.P. Li and Y. Chen	450
Time Management Model of Workflow Based on Time Axis	
N. Deng, X.D. Zhu, Y.N. Liu, Y.P. Li and Y. Chen	458
Fuzzy-PID Control Application in Temperature Automation Control System of Tunnel Kiln	
K.L. Zhou, J. He and Q. Tan	466
Part Shape Information Acquisition Based on Stereoscopic Vision	
J.N. Gu, S.J. Chen and B.G. Shen	472
Dynamic Model of SCARA Robot	
J. Fang	476
Research on Key Technology of Truss Tomato Harvesting Robot in Greenhouse	
C. Ji, J. Zhang, T. Yuan and W. Li	480

Chapter 8: Information Technology and Data Processing

3D Visualization for Detailed Sedimentary-Facies Modeling of Lishui Depression, East China Sea Basin	
J.S. Liu, X. Li, J.L. Zhang and C.L. Li	489

A Method for Real-Time Medaka (<i>Oryzias latipes</i>) Detection Base on Machine Vision Technology	
H.Y. Zheng, R. Zhang, C.W. Yang and Y.Q. Hu	494
A Key Management Scheme for Smart Grid Wireless Terminals	
B. Zhang, Y.F. Wang, T. Zhang and Y.Y. Ma	501
Several Realizations of the Finite Element Software ANSYS Structural Analysis	
B. Wang, Y. Zhang and R.J. Chen	507
Analysis and Design on Cloud Computing Monitoring Framework of Internet Public Opinion	
G. Li, X.Q. Zhang, Z.T. He and T.K. Ji	511
Comparison and Assessment of Different Image Registration Algorithms Based on ITK	
Z.H. Zhou	515
Multi-Sensor Life Detection Synergy Platform Design	
J.S. Yang, X.L. He and L.X. Li	520
Distributed Data Aggregation Algorithm in Wireless Sensor Networks	
X.L. Li, J.W. Zhang and H.T. Zhang	526
Dynamic Multi-Hop Routing Protocol in Wireless Sensor Networks	
X.L. Li, J.W. Zhang and L.B. Liu	532
Research on Data Transmission Technology Based on Raptor Code in Wireless Sensor Networks	
X.F. Peng, Y. Yang, C. Yang and K.L. Wang	538
Study on Deformation Inspection System of Car Seat Frame Based on Virtual Instrument	
X.Q. Zhong, S.K. Chai, T. Hu and G. Shi	544
A Mix-Integer Programming Model for Inventory Slab Allocation Problem	
X. Xie, Y.P. Li, Y.Y. Zheng and X.L. Li	549
Research on 3D Route Planning for UAV in Low-Altitude Penetration Based on Improved Ant Colony Algorithm	
T. Deng, Z.M. Xiong, Y.J. Liu and Q.Z. Meng	556
Quadratic Independent Component Analysis Based on Sparse Component	
J.H. Wang and S.G. Tang	562

Chapter 9: CAD/CAM/CIM

Rapid Design Platform of Gear Box Based on Modern Design Methods of Pro/E	
Q.Y. Ju, X.H. Li and J. Mao	571
Study on Open CNC System Platform Architecture and its Application	
J.Z. Hui, K. Gao and X. Ding	577
Research on Software Architecture of Bridge CAD System	
Q. Kang, G.J. Ren and Y. Xu	583
Designing Interactive Virtual Products Using VRML and Java	
D.X. Yu and H. Song	588
Study on the Forming Process of the Crossmember in Car Intermediate Floor	
X.X. Wang, P.C. Guan, H.P. Li, L.H. Wang, N. Zhang, X.X. Geng and S.N. Li	593
A Rapid Planning Method for the Freeform Surface Spraying Based on CAD Model	
S.M. Xu and W.J. Li	599

Chapter 10: Other Topics

Models of Choice between Shopping and E-Shopping	
V. Barone, F. Crocco and D.W.E. Mongelli	607
Research on Continuous Traffic Safety Evaluation of Yangtze River Shipping	
K.J. Xu, Q. Liu and L. Xu	617
The H_{∞} Robust Control of Global Supply Chain System Based on Demand and Time Uncertainty	
Q. Zhang and Y.H. Ru	623
Lean Build Evaluation Index System of the Supply Chain of Health Research	
J. Wang and R.Q. Ma	628

Freight Transport Demand Models for Applications in Urban Areas

V. Barone, F. Crocco and D.W.E. Mongelli

634

The Design and Application of Dynamic Symbol

J.W. Huang, K.Q. Wang, P.H. Chen, J. Bao and P.Z. Zhao

645