ISBN(softcover): 978-3-03785-901-8 ISBN(eBook): 978-3-03826-282-4

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-TiO_2 and Steel Fibers
B. Wang, Y. Zhang and R.J. Chen 83

Synthesis of Tetragonal $BaTiO_3$ 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 *Cerrena unicolor*
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 *Magnolia sieboldii*
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 (*Oryzias latipes*) 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