Table of Contents

Preface

Chapter 1: Properties of Structural Materials

Effect of Hydrogen Trapping and Poisons on Diffusion Behavior of Hydrogen in Low Carbon Steel	
L. Cai and L.M. Zhao	3
Study on Preparation and Modification of Oil-Soluble Nano-MMT Y. Cao, G.Y. Li, H.W. Nie, J.L. Zhang and B.S. Lin	11
Application of 3D-DIC Method on Crack Forming Process of Concrete under Axial Compression	21
L.J. Wang, J.J. Li, Y.M. Qi, X.H. Tan, S.P. Deng and Q. Li Effect of Current Density on the Microstructure and Corrosion Properties of MAO	21
Coatings on Aluminum Alloy Shock Absorber Y. Shen, H.X. Wang and Y.P. Pan	28
Study on Microstructure and Properties of Nanocomposite Coating Prepared on the Surface of Exhaust Pipe for Ship Y. Shen, Y.P. Pan and H.X. Wang	39
Study on the Residual Stresses Distribution in Thick Pre-Stretched Aluminum Plate H. Guo, D.W. Zuo, F.H. Yin, Y.F. He, J. Xu and B. Chen	49
Experimental Study on Surface Element Composition and Hydrophobic Properties of DLC Coating	
C.H. Dong, X.T. Wei, Z.Y. Li, W.L. Shi and Z.G. Wang	58
The Influences of Surface Roughness on the Water Contact Angle for Coated Substrate with F-DLC	
X.T. Wei, W.L. Shi, Z.Y. Li, Z.G. Wang, X.L. Wu and J. Xu	68
The Influence of Surface Welding Using EDTCrMnSi Special Wire on the Wear Resistance of 16Mn Steel	
H.X. Wang, X.X. Li, P.Z. Ying and H.M. Yin	78
Research on Friction Property of Pin on Disc and Analysis of Wear Mechanism Based on MMW-1A Friction and Wear Testing Machine	0.6
Z.P. Chen, X.Y. Jin, C. Ji, C. Wang and J.L. Zhu	86
Chapter 2: Technologies of Materials Machining in Mechanical Engineering	
Experimental Research on Electroforming Nano-ZrO ₂ Reinforced Cu-Matrix Composite Aided by Pulse Power	
Z.W. Sima, Z.Y. Li, H.B. Cui and H. Guo	95
Effect of Abrasive Particle Size on Lapping of Sapphire Wafer by Fixed Abrasive Pad J.B. Wang, Z. Li, Y.W. Zhu, B.C. Jiang and P.C. Shi	106
The Thermal Stress Simulation of the Part Caused by Layer Thickness and Deposition Velocity in FDM Process Y.R. Zhou, X.L. Qiu, M. Hu and J. Li	115
Research on Electronic Discharge Grinding of Polycrystalline Diamond Based on Response	113
Surface Method J.J. Tang, H. Zhang, P.Q. Ye and C.H. Wang	123
Fabrication and EDM Corrosion Resistance of Copper Electroforming Layer on Tube Electrode for Aero-Engine Blade Cooling Hole in EDM Process Z.Y. Li, Q.W. Cui, B. Chen, J. Xu and H. Guo	133
The Investigation of the Effect Caused by Deposition Velocity on Bonding Degree within the Structure of FDM	1 40
J. Li, H.B. Li, J.C. Dong, T.Y. Wang and H.T. Zhang	142

Quantitative Study on Abrasive Belt Wear Based on Geometric Parameters Z. He, J.Y. Li, Y.F. Wu and Y.M. Liu	156
Influence of Nano Al ₂ O ₃ Particles on Morphology and Microstructure of Cu-Al ₂ O ₃ Composite Coating by Jet Electrodeposition	164
H. Fan, M. Liu, Y.P. Zhao and S.K. Wang	164
Research on Milling Deformation in Ultrasonic Vibration Assisted End Milling of Titanium Alloy Thin-Walled Parts F. Jiao, L. Zhao, C.L. Yao and F. Qi	174
Finite Element Analysis on Single Abrasive Grinding Ti6Al4V Alloy W.G. Huo, X.Y. Zhang, Q.Y. Dong and J. Shao	184
Nanosecond Laser Direct-Part Marking of Data Matrix Symbols on Titanium Alloy	
Substrates C.L. Li, C.H. Lu and J.M. Li	194
The Roll-Forming Process Analysis of the Situation and Development Trend M. Hu, Y.B. Li, X. Li, X.L. Cao and M. Hou	201
Effect of Ultrasonic Vibration Assisted Grinding Process on Surface Topography and Properties of C/SiC Composite Y. Wang, B. Lin, Y.Y. Ding, Z.Q. Fu, X.F. Zhang and Y.H. Dong	210
	210
Research on the Quality of Laser Marked Data Matrix Symbols C.L. Li, C.H. Lu and J.M. Li	219
Optimization and Affections of Cathode Feed Angle on Machining Accuracy Error Distribution of Aero-Engine Blade in Electrochemical Machining	
Z.Q. Zhao, Z.G. Ma, Y.T. Liu, X.L. Wu and H. Guo	225
Study on Honing Mechanism of Gear Surface Using an Internal Honing Wheel Based on Single-Particle Abrasive G.Z. Zhang and J. Han	235
Study on Two-Step Aging Technology of 6082 Aluminum Bumper	200
B.M. Zhao, M. Hu, J. Zhu, Z.Y. Han, H.Q. Sun and Y.L. Ji Research on Milling Force in Ultrasonic Assisted End Milling of Titanium Alloy Thin-	245
Walled Parts F. Jiao, C.L. Yao, L. Zhao and F. Qi	252
Cutting Performance of Reaming Alloy Gray Cast Iron HT250 Using Carbide, Cermet and CBN Reamers	261
X.K. Yang, Y.G. Wang, W.L. Ge, L. Chen and H. Ge	261
Simulation Analysis of RuT450 Drilling Force Based on LS-DYNA Gun Drilling H. Guo, W. Yang, L. Liu, X.K. Yang, Y.G. Wang, L. Chen and H. Ge	271
The Effect of Cutting Force Vibration on Machining Quality for Reaming ZL102 Alloy with PCD Step Reamer X.D. Wang, W.L. Ge and Y.G. Wang	279
A.D. Wang, W.E. Oc and T.G. Wang	217
Chapter 3: Process Modeling and Optimization of Technological Parameters and Tool in Materials Machining	
Feed Optimization of Cycloidal Bevel Gear Format Cutting Based on Equal Cutting Area W. Yong, Y. Zhang, Z.Y. Cao, J.G. Yao, M.K. Shi and X.Y. Cao	293
Study on Simulation of Stamping Forming and Die Surface Optimization of Aluminum Alloy Plate	
M. Hu, Z.Q. Yang, X.L. Cao, Q. Yang, Y. Chen and X. Li	303
Melt Mold Casting Process Optimization of Train Coupler Based on ProCAST C.J. Wang, J.Y. Chen and Y.Z. Shen	312
Research on the Effect of Cutter Position Points Distribution Optimization on Surface Milling Accuracy J. Li, H.B. Li, H.T. Zhang and P. Zhang	323
Parametric Programming of Multi-Type Holes Using the Improved Genetic Algorithm	323
Y.B. Zhang, T.Y. Wang, Y.Y. Ding, T.Y. Shen, J.J. Dong and S. Gao	333
The Cutting Parameter Optimization in Helical Milling of Ti Alloys with Small Diameter Tools and the Study of their Cutting Performance S.P. Li, L.C. Tian, X.D. Qin and S. Shang	342

Study on Parameter Optimization and Tool Wear of Milling Compacted Graphite Iron RuT450 Cylinder Block	
L. Chen, L. Liu, H. Guo, C.W. Li, X.K. Yang and Y.G. Wang	351
Research on Metamorphic Vibration Casting Process Based on EDEM-FLUENT Coupling C.J. Wang, Y. Zheng and K. Liu	361
Study on High-Frequency Fatigue Properties of PVD AlTiN Coating of Cutting Tool N.C. Wang, Q.F. Liu, X. Cheng and F. Jiang	370
Analysis of Computational Model of Seamless Steel Pipe Rolling Contact Force L.J. Li, X. Han and S.Q. Liu	376
Grinding Process of Ball End Milling Cutter Flank Q.Q. Xin, T.Y. Wang, Z.Q. Yu and H.Y. Hu	383
Dynamic Response Analysis of Tandem Rolling Mill in Rolling Process X. Han and L.J. Li	391
Instantaneous Uncut Chip Thickness Model in End Milling Based on an Improved Method Y. Zhang, Z.Q. Yu and T.Y. Wang	399
Research on GC Cup Truing Technology of Super-Hard Grinding Wheel Z.X. Yao, J.M. Xu and L. Zhang	408