

Table of Contents

Preface, Committees and Sponsors

Experiment and Discussion on Ultrasonic Vibration-Assisted Single Point Diamond Turning of Die Steels

X.D. Xie, Y. Li, C.V. Duong and A. Al-Zahrani 1

A Novel Orderly Arrangement Method Controlled by Magnetic Field for Diamond

Abrasives of Grinding Wheel

S.H. Yin, F.J. Chen, J.W. Yu and M. Wang 6

Influence of Cup Wheel Grinding and Etching Pretreatment on Residual Stress and Surface Topography for Coated Cemented Carbide Tools

T.J. Song, Z.X. Zhou, W. Li and A.M. Tang 10

Precision Grinding of Structured Tungsten Carbide Mold

H. Suzuki, T. Furuki, M. Okada, Y. Yamagata and S. MORITA 15

Analysis on Kinematic Characteristics of Precision Balls Grinding

Y. Dai, D.H. Ding, X. Xiao, X.S. Liu, R.J. He and L. Li 20

Study on Machining Characteristics of Sawing Al_2O_3 Ceramic with Diamond Cut-Off Wheel

F.B. Zheng, M. Chen, J.Y. Shen, H. Guo and X.P. Xu 25

Wear Mechanism of High-Speed Turning Ti-6Al-4V with TiAlN and AlTiN Coated Tools in Dry and MQL Conditions

J.Y. Xu, Z.Q. Liu, Q.L. An and M. Chen 30

Study on Fracture Performance of *In Situ* Growth Whisker Toughened Composite Ceramic Tool

X.W. Chong, C.Z. Huang, B. Zou, L. Xu, G.L. Zhao and H.L. Liu 35

The Performances of Different Coated Carbide Drills when Drilling a Cast Nickel-Based Alloy

C. Xue and W.Y. Chen 41

New Approach for Noncircular Following Grinding of Crankshaft Pin

H.X. Yu, Y. Zhang, X.H. Pan and M.C. Xu 46

Study on the Process of Gear Shaft Formed by Cross Wedge Rolling Based on Deform

F.Q. Ying, J.D. Shen and L.D. Wu 56

Research on the Surface Roughness Predictive Model of Austempered Ductile Iron Based on Genetic Algorithm

T.T. Chen, X.H. Guo and H.J. Yang 61

Study on Dynamic Stiffness of Machine Tool with Consideration of Friction Damping in Guide

M. Shinagawa and E. Shamoto 68

Fabrication and Cutting Performance of CVD Diamond Coated Inserts with Different Coating Thickness in Dry Turning Aluminum Alloy

J.G. Zhang, L. Wang, B. Shen and F.H. Sun 73

Influence of Diameter and Number of Orifice on Static Characteristics of Radial-Thrust Aerostatic Bearing

F.H. Zhang, S.F. Wang, Q. Zhang and P.Q. Fu 78

Research on High Performance Vitrified Bond Diamond Wheel

Y.B. Liu, W. Liu, X. Huang and H.P. Zhang 83

Optimum Design for the Frame of Open Type Abrasive Flow Polish Machine

L.L. Yuan, K.H. Zhang and L. Min 89

Cutting Performance and Failure Mechanisms of Coated Carbide Tools in Face Milling Powder Metallurgy Nickel-Based Superalloy

Y. Qiao, X.L. Fu and X.F. Yang 94

Study on Dynamic Characteristics of a Hydrostatic and Hydrodynamic Journal Bearings for Small Diameter Grinding Spindle

Z.Q. Hou, W.L. Xiong, X.B. Yang and J.L. Yuan 99

Current Research Trends on Resin Bond Used for Abrasive Products

Q.F. Deng, Z.X. Zhou, Y.G. Ren, B.H. Lv and J.L. Yuan 105

Influence of Soluble Filler on the Mechanical Properties of Porous Self-Generation Superabrasive Tool	110
B.H. Lv, C.W. Wang, C.S. Wang, Z. Wu and J.L. Yuan	
Research on Soil Vibratory Cutting with ALE Finite Element Simulation Method	115
J.D. Jiang, J. Gao and W.B. Hoogmoed	
Transient Heat Transfer Simulation in Rapid Heat Cycle Molding with Electric Heating	121
S.F. Jiang, Y. Kong, J.Q. Li and G.Z. Chai	
Tool Breakage Feature Extraction in PCB Micro-Hole Drilling Using Vibration Signals	126
Z.H. Ren, X.H. Zheng, Q.L. An, C.Y. Wang and M. Chen	
Effects of Process Parameters on Surface Gloss in Rapid Heat Cycle Molding Process	132
J.Q. Li, C. Chen, S.F. Jiang, G.Z. Chai and Z.B. Lian	
New Measurement Concept of Nanometer-Level Defects on Si Wafer Surface by Using Micro Contact Sensor	137
W.J. Lu, Y. Shimizu and W. Gao	
Absolutely Testing of Off-Axis Aspherical Mirror Using Dichotomy Computer-Generated Holograms	142
C. Xie, S.Y. Li and S.Y. Chen	
Dual-Servo Mechanism of STM for Measurement of Sub Millimeter Deep Trench Structures	146
W. Zhang, C. Jin, Y.L. Chen and B.F. Ju	
The Acoustic Micro Integrated Detection Technique for Silicon Wafer Processing	151
A.Y. Sun and B.F. Ju	
XTEM Observation of 4H-SiC (0001) Surfaces Processed by Plasma Assisted Polishing	156
H. Deng and K. Yamamura	
Plasma Chemical Vaporization Machining of Silicon Carbide Wafer Using Flat-Bar Electrode with Multiple Gas Nozzles	160
Y. Sano, K. Aida, H. Nishikawa, K. Yamamura, S. Matsuyama and K. Yamauchi	
Simulation of Large Scale KDP Crystal Polishing by Computer Controlled Micro-Nano Deliquescence	165
H.P. Zhang, D.M. Guo, X. Wang and H. Gao	
Study of Magnetorheological Brush Finishing (MRBF) for Concave Surface of Conformal Optics	170
Y. Zhang, J.F. Zhi, Y.W. Yu, X.X. Zhu and W. Zuo	
The Composite Ultra-Precision Processing Technology for the Small Aspheric Mould of Stainless Steel	176
S.H. Yin, Z.Q. Xu and J.W. Yu	
Analyze and Verify Cutting Depth Distribution of Different Grits Size SFAP	180
X. Lv, Z.X. Li and Q.F. Deng	
CVD Diamond Film Polishing Based on Accelerant Theory	185
L. Zhang, S.J. Ding, D.H. Wen, Z.H. Xu and S.M. Ji	
A New Method for Free Surface Polishing Based on Soft-Consolidation Abrasive Pneumatic Wheel	190
S.M. Ji, X. Zeng and M.S. Jing	
A Study of the Solid-State Reaction for Polishing Sapphires	195
Q.F. Deng, Z.X. Zhou, Z.Z. Zhou, J.L. Yuan and J.C. Wang	
Study on Polishing Technology of GaAs Wafer	200
Q.F. Deng, T. Kong, G. Li and J.L. Yuan	
New Researches for Fabrication of Micro-Pin in Micro-ECM	205
M.H. Wang, T. Wang and W. Peng	
Three-Dimensional Surface Error Reconstruction and Ion Beam Figuring of Optical Hemisphere	210
W.L. Liao, Y.F. Dai, X.H. Xie, L. Zhou, Z.W. Zheng and C. Xie	
Experimental Research on Microburrs of High Speed Drilling of PCB Using Microdrill	215
X.H. Zheng, Z.Q. Liu, C.Y. Wang, Q.L. An and M. Chen	
Ultrashort Pulsed Laser Micromachining of Polycrystalline Diamond	220
Z.Q. Li, Q. Wu and J. Wang	
Fabrication of Polycrystalline Diamond Tools by Micro Electrodischarge Machining	225
Z.Y. Zhang, H.M. Peng, J.W. Yan and T. Kuriyagawa	

Ultra-Wide Car Lens Optimization Based on Low-Tg Aspheric Glass	230
Y.J. Zhu, J.X. Na, J.F. Sun and S.H. Yin	
Size Effects on Transferability and Mold Change of Glass Molding Press for Microgrooves	235
T.F. Zhou, J.W. Yan and T. Kuriyagawa	
Finite Element Analysis on Non-Isothermal Glass Molding	240
K.J. Zhu, S.H. Yin, J.W. Yu, Y.J. Zhu, S. Jin, Y.F. Wang and J.J. He	
Application of Orthogonal Test in Numerical Simulation of Glass Lens Molding	245
D.C. Zhang, K.J. Zhu, Y.J. Zhu, S.H. Yin and J.W. Yu	
Study on Material Removal Rate of CMP 6H-SiC Crystal Substrate (0001) C Surface Based on Abrasive Alumina (Al_2O_3)	250
J.X. Su, J.X. Du, X.L. Liu and H.N. Liu	
Effect of Pad Surface Asperity on Removal Rate in Chemical Mechanical Polishing	256
M. Uneda, Y. Maeda, K.I. Ishikawa, K. Shibuya, Y. Nakamura, K. Ichikawa and T.K. Doi	
Development of Novel Groove Patterns for CMP Pad	264
T. Yamazaki, T.K. Doi, S. Kurokawa, O. Ohnishi, M. Uneda, K. Seshimo and H. Aida	
Research on Process Parameters Intellectual Decision Support System for High Efficiency and Precision CMP Function Ceramics	268
Z.H. Hu, M.K. Gao, J.L. Yuan and X.J. Yang	
Experimental Study of Material Removal Rate for Rotary Curved Surface Workpieces of Si_3N_4 in Chemical-Mechanical Polishing Using Taguchi Technique	273
L.L. Wan, Z.H. Deng, S.C. Li and P. Long	
Study on Groove Shape of CMP Polishing Pad: A Review	278
C.L. Lou, H.Y. Di, Q. Fang, T. Kong, W.F. Yao and Z.Z. Zhou	
Research on the Fracture Property of Glass Plate under Uniform Pressure	284
Z. Wu, B.H. Lv, J.L. Yuan, C.W. Wang, D.N. Nguyen and P. Zhao	
FEA on Deformation Behavior of Glass Plate in Elastic Deformation Machining Process	289
D.N. Nguyen, B.H. Lv, J.L. Yuan, Z. Wu and P. Zhao	
Research on Ultra-Precision Machining of Silicon Nitride Ceramics: A Review	294
S.J. Dai, Y.G. Ren, T. Kong and Y.L. Hu	
Research on Tool Wear and Surface Characteristics in Ultrasonic Milling Carbon Fibre Reinforced Carbon Composite	299
G.F. Gao, Y.Y. Zhao and X.H. Ma	
Optical Performance of a Laser Point Source Strongly Emitted by an Aspheric Expander	304
S.C. Park, T.K. Doi, S. Kurokawa and O. Ohnishi	
Nanoparticulate-Reinforced Ti-Base Composites Prepared by Laser Cladding	311
W.F. Wang	
Electrochemical Machining of Micro Slots Using Shaped Electrode	315
X.L. He, Y.K. Wang, Z.Q. Zeng, Z.L. Wang and W.S. Zhao	
CAD/CAM System of Micro-WEDM for a Micro-Air Journal Bearing Fabrication	320
Z.Q. Zeng, Y.K. Wang, X.L. He and Z.L. Wang	
Numerical Simulation on Vibration-Assisted Ultra-Precision Cutting of Steel AISI 1045 with PCD Tool	324
A. Al-Zahrani, X.D. Xie and Y. Li	
Research on Processing Mechanism of Multi-Cell-Disc	329
L. Li, Y. Dai, R.J. He and D.H. Ding	
A Study on Feeding Technology of Motorbike Crankcase in Multidirection Squeeze Casting	334
T.H. Peng, Y. Wang, L.D. Wu and L.Y. Li	
Research and Simulation of the Temperature on Multi-Squeeze Casting	339
H.P. Xu and L.Y. Li	
Influence of Low-Temperature Freezing Treatment on Micro-Area Hardness and Residual Stress of SiCp/Al Composites	344
X.L. Yu, S.T. Huang, W.Z. Zhao and L. Zhou	
Simulation on Hydraulic Performance of Two Kinds of Coring Diamond Bits with Different Crown	350
Y. Chen, Z.Y. Liu and L.C. Duan	
Numerical Simulation for Cold Extrusion of Bevel Gear	356
Q.H. Yang, J. Pan, J.X. Zhang, W.B. Chen and B. Meng	

Development of Electric Rust Preventive Machining Method - Correspond to Difference of Water in World: Use of Deionized Refined Water	
N. Nishikawa, Y. Sato, K. Kudo, T. Murase, T. Sawa, H. Kato, N. Yoshihara, H. Okawai, K. Karita, T. Iyama, M. Mizuno and S. Tsukamoto	365
Development of Electric Rust Preventive Machining Method - Correspond to Difference of Water in World: Use of Adjusted Synthesized Water	
N. Nishikawa, Y. Sato, K. Kudo, T. Murase, T. Sawa, H. Kato, N. Yoshihara, H. Okawai, K. Karita, T. Iyama, M. Mizuno and S. Tsukamoto	373
Path Optimization of the Drilling Hole Based on Genetic Algorithm	
J.M. Chen and W.G. Guo	382
Gasify Micro-Oil Ignition Technology Based on Level Set Methods	
B. Wang, Y. Xie and J.G. Xiong	387