

Table of Contents

Preface

Mechanism of Brittle-Ductile Transition of Single Silicon Wafer at Different Temperatures Y.L. Sun, D.W. Zuo, Y.W. Zhu, D.S. Li, M. Qi and M. Wang	1
Mechanism of Material Removal and the Generation of Defects by MD Analysis in Three-Dimensional Simulation in Abrasive Processes J.X. Chen, Y.C. Liang, Q.S. Bai, Y.L. Tang and M.J. Chen	6
Study of the Wettability between Diamond Abrasive and Vitrified Bond with Low Melting Point and High Strength J.B. Zang, J. Lu, Y.H. Wang, X.H. Zhang and Y.G. Yuan	11
Effect of Si and Ti Coating on Interface Bonding between Diamond and Fe-Based Metal Bond J. Lu, Y.H. Wang, J.B. Zang and S.X. Shan	15
Nanodiamond Modified with SHP Y.W. Zhu, F. Xu, J.L. Shen, B.C. Wang and X.Y. Xu	19
Study on Tribological Performance of Fine-Grained Diamond Films B. Shen, W. Zuo, F.H. Sun and M. Chen	23
The Experimental Study on Wear Performance of Brazed Diamond Grits Y. Chen, H.J. Xu and Y.C. Fu	28
Grinding Titanium Alloy with Brazed Monolayer CBN Wheels C.Y. Yang, J.H. Xu, W.F. Ding and S.T. Tong	33
High Performance Grinding Zirconia Ceramics by Brazed Monolayered Diamond Wheels S.S. Li, J.H. Xu, B. Xiao, Y.C. Fu and H.J. Xu	38
Laser Brazing of Diamond Grits with a Ni-Based Brazing Alloy Z.B. Yang, J.H. Xu, Y.C. Fu and H.J. Xu	43
Experimental Study on Porous Metal Bonded Diamond Grinding Wheels (II) — Grinding Performance of Porous Wheels Q.L. Dai, C.B. Luo and C.J. Liao	48
Research on Interfacial Microstructure of Ti-Coated Diamond Brazed and Uncoated Diamond Brazed by High-Frequency Induction B.J. Ma, Y.C. Fu, W.F. Ding, W. Gao and H.J. Xu	53
Study on the Wear Mechanism of Brazed Diamond Grains G.Q. Zhang, H. Huang and X.P. Xu	58
The Characteristic of Organic Bond Grinding Wheel M.W. Chen, J.L. Yuan, Y. Yang and D.Q. Yu	63
A High-Speed Nickel Plating Bath for Manufacture of Diamond Tools B.S. Pan and Y. Yang	68
Mechanical Behaviors of Metal-Bonded Diamond Abrasive Tools with Different Grit Sizes Y.Q. Yu, X.R. Tie and X.P. Xu	73
Vibration Characteristic Analysis of Diamond Saw Blade with Multitude Holes Structure for Vibration and Noise Reduction S.S. Hu, Y.N. Hu, C.Y. Wang and C.X. Chen	78
Finite Element Modeling and Blister Test to Investigate the Adhesive Strength of Diamond Thin Film D.H. Xiang, M. Chen and F.H. Sun	85
Precision form Grinding of Ceramic Materials with Diamond Grinding Wheel Z.M. Cui, D.J. Zhu and L. Du	90
Passivation Model of Diamond Grinding Wheel in Constant-Force Grinding of Si₃N₄ Ceramic X.L. Tian, Z.Y. Wu, A.Y. She and Z.X. Hu	94
Formation and Control of Burr in Grind-Hardening G.C. Wang, J.D. Liu, Q.F. Li, Y.M. Zhu, H.J. Pei and J.Y. Zhang	98
Experimental Investigation on Effects of Depth of Cut on Micro-Geometric Properties in Quick-Point Grinding S.C. Xiu, C.H. Li and G.Q. Cai	103

High-Efficiency and Precision Grinding Technology of HIPSN All-Ceramic Bearing Race S.H. Li and Y.H. Wu	108
Experimental Researches on Precision Grinding of KDP Crystal Q.G. Wang, H. Gao, Q.Z. Zhang, X.S. Cao and R.K. Kang	113
Comparison of Power in CBN Grinding of Steels and Stone X.P. Xu and C.J. Du	118
Removal Process Technology of Precision Grinding for Complicated Surface Part of High Performance Hard and Brittle Materials T. Ji, D.M. Guo and G.H. Bian	123
Analysis of Influence Factors for the Contact Length between Wheel and Workpiece in Surface Grinding C. Mao, Z.X. Zhou, D.W. Zhou and D.Y. Gu	128
Thermal Study in Diamond Grinding of Zirconia J.Y. Shen, F.Y. You and X.P. Xu	133
A New Technology of Improving Surface Quality of Engine Cylinder X.J. Zhu, H.J. Xu, Y.X. Gao and Z.M. Lu	138
A Study on Grinding Performance of Porous NiTi Shape Memory Alloy Y.Y. Tao, J.H. Xu and W.F. Ding	143
Research on Grind-Hardening Temperature and Cooling Rate of 48MnV Microalloyed Steel B. Xiao, H.H. Su, S.S. Li and H.J. Xu	148
Force Characteristics in Drilling of Engineering Ceramic with a Brazed Diamond Tool H. Huang, C.F. Huang and X.P. Xu	153
Parameters Optimization on the Lapping Process of 9Cr18 with Taguchi Method X.F. Zheng, J.L. Yuan, D.H. Wen and F.Y. Lou	158
Study on the Control and Test of High Precision Honing Machine for Injection Nozzle L. Shi	162
Numerical Simulation Study on Truing and Dressing of Bronze-Bonded Diamond Wheel with Pulsed Laser G.Y. Chen, L.F. Mei, B. Zhang, D.J. Zhu and G.G. Chen	166
Experimental Research on Erosion and Corrosion of WC-Base Matrix Materials for Drill Bits under Impingement of Drilling Muds L.C. Duan, A. Neville and Y. Yan	171
Research and Practice on the On-Line Measurement of Cylindricity Error in a Grinding Machine L. Zhang, Y. Zhao and L. Ba	176
A Calculating Method of the Least Feeding Times in Cylinder Cam's Grinding Y.T. Zhang, Z.Q. Hu and H.L. Zhang	181
The Experiment Method of the Study on the Airflow Field around the Grinding Wheel in Super-High Speed Based on PIV Y.D. Gong, H. Li, Y.C. Zhang, G.Q. Cai and Z.H. Deng	185
Dynamic Intelligent Prediction Control in Slender Cylindrical Grinding N. Ding, X.M. Li, Y. Ding, G.F. Li and L.S. Wang	189
Interpretative Structural Modeling for Ceramic Grindability System A.B. Yu, N. Zhao, Y.L. Wang and X.L. Tian	194
Study on Self-Configuration Method of Neural Network Model for Grinding Troubles On-Line Monitoring G.J. Liu, Q. Wang, X.L. Shi and R.K. Kang	199
An Optimal Feed Interpolation with Jerk-Limited Acceleration for Five-Axis Grinding J.C. Feng, Y.H. Li, Y.H. Wang and M. Chen	204
Real Time Thermal Error Modeling and Compensation of 5-Axis NC Grinding Machine Tool X.S. Wang, J.G. Yang, H. Wu and J.Y. Yan	210
Study on Squeeze Oil Film Damper in Ultrahigh Speed Grinding T.B. Yu, Y.D. Gong, H.F. Zhao, S. Liang and W.S. Wang	215
Monitoring and Compensation of Thermal Error of Profile Grinding Spindle L.M. Xu, L. Shi, X.M. Zhao and D.J. Hu	219

Experimental Study on the Hardened Surface Layer of Grinding SKD-11 Hardened Steel W.W. Ming, G. Liu and M. Chen	224
Experimental Investigations on Surface Residual Stresses in the As-Sprayed and Ground Nanostructured WC/12Co Coatings Z.H. Deng, Z.W. Hu, Q. Jing and Y.D. Gong	229
Surface and Sub-Surface Integrity of Ultra- Machined BK7 Using Fine and Coarse Grained Diamond Wheels Q.L. Zhao, B. Wang, E. Brinksmeier, O. Riemer, K. Rickens and J. Corbett	234
Experiment Study on Residual Stresses Based on Quick-Point Grinding with Vitrified CBN Wheel Z.R. Pang, S.X. Yuan, W.S. Wang and C.X. Zhu	239
Experimental Investigation into Surface Integrity Finished by Abrasive Jet with Grinding Wheel as Restraint C.H. Li, S.C. Xiu and G.Q. Cai	244
Lapping Process of Diamond Cutting Tool by Molecular Dynamics Simulating Z.Q. Li, T. Sun, Y.D. Yan, J.J. Zhang, Y.C. Liang and S. Dong	249
Study on Contact Mechanism of Interface in Wafer CMP Based on Abrasion Behavior J.X. Su, X.L. Zhang, X.Q. Chen, J.X. Du and D.M. Guo	254
Design of Surface Finish Using Synchronous Process of Grinding and Electrochemical Finishing P.S. Pa	259
Hydrodynamic Analysis of Circular Translational Polishing under Mixed Lubrication W.J. Zhai, C.X. Liu and P.L. Feng	264
Research on Nanoscale Material Removal Process Using Atomic Force Microscopy F.H. Zhang, H.L. Zhang, Y.D. Yan and J.H. Wang	269
Experimental Study of Precision Polishing of Hard and Brittle Material L.H. Dong, C.H. Fan, J. Huang and H.X. Luo	274
Influences of Machining Parameters on Silicon Wafer Polished with Gel-Coupled Ultra-Fine Abrasive Polishing Pads J. Liu and X.P. Xu	279
Study on Mechanical Polishing for CVD Diamond Films of Forming Nucleus Surface and Growing Surface R.F. Chen, D.W. Zuo, W.Z. Lu, D.S. Li, F. Xu, T. Ji and M. Wang	285
Research on the Hydrodynamic Electro-Chemical Mechanical Polishing for Silicon Wafer with Suspension Fluid J.M. Zhan and D. Zheng	290
Study of Finishing Internal Surface Using Magnetic Force Generated by Rotating Magnetic Field in Electromotor X.G. Yao, S.Y. Wang, Y.H. Ding, G. Ya and J. Zhang	295
Experimental Study on Increasing Magnetic Abrasive Finishing Efficiency of Finishing Nonferromagnetic Materials S.R. Zhang, L.F. Yang and G.X. Wu	300
Optimize Parameters of Floating Polishing with Tri-Polishing-Disk X.C. Xu, Z.J. Yuan and B. Lin	305
Study on Pad Conditioning Parameters in Silicon Wafer CMP Process Z.Z. Zhou, J.L. Yuan, B.H. Lv and J.J. Zheng	309
Technique Optimization of Dual Rotation Plates Lapping Method for Ceramic Ball X. Lv, J.L. Yuan and Y. Dai	314
Study on the Surface Integrity of Polished Diamond Thick Film Prepared by EACVD F. Xu, D.W. Zuo, R.F. Chen, W.Z. Lu and M. Wang	319
The Performance and Optimization of Slurry on the Double Sided Polishing Process of Silicon Wafer W. Li, G.X. Hu, X.D. Hu and X.Z. Hu	324
New Thought for Designing the Multi-Phase and Multi-Scale Nanocomposite Ceramic Tool Materials H.L. Liu, C.Z. Huang, X.Y. Teng and H. Wang	329
Crown Modification of Cylinder-Roller Bearing Raceway Using Electrochemical Abrasive Belt Grinding W.J. Xu, B. Tao, G.B. Pang, X.Y. Wang and X.H. Zhao	335

Surface Texturing Technology by Laser Honing Based on Hydrodynamic Lubrication Y.K. Zhang, C.J. Yang, Y.H. Fu, J.Z. Zhou, X.J. Hua and J.H. Ji	340
Research on Micro-Mechanism of Nanocomposite Ceramic in Two-Dimensional Ultrasound Grinding B. Zhao, Y. Wu, G.F. Gao and F. Jiao	344
Experimental Study on the Ultraprecision Lapping Technology of the Copper Substrates for Alloy Films C.R. Zhu, Q. Xu, J.L. Yuan, D.H. Wen and B.H. Lv	349
Influences of Ultrasonic Assistance in High Speed Lapping of Nano ZTA Engineering Ceramic on the Surface Machining Quality F. Jiao, B. Zhao, C.S. Liu and X.S. Zhu	355
Electrochemical Grinding for Unclosed Internal Cylinder Surface P.M. Ming, D. Zhu and Z.Y. Xu	360
Study on the Performances of the Ferromagnetic Poles Based on the Curved Surface Magnetic Abrasive Finishing Y.H. Ding, X.G. Yao, X.X. Wang and S.C. Yang	365
Basic Experimental Research on the NC-Contour Evolution Ultrasonic Assisted Grinding Ceramic Blade Surface J.X. Zheng and J.W. Xu	369
Experimental Research on Small Holes by Electrical Discharge Machining Combined with Ultrasonic Vibration and Assisted Inwall Polish with the Ultrasonic Vibrating M.R. Cao, S.C. Yang, W.H. Li and S.Q. Yang	374
Experimental Study on Lapping Force Characteristics of Hard-Brittle Materials in Ultrasonic Vibration Lapping C.J. Zhang, C.S. Liu, B. Zhao and W.J. Jiang	379
A Mechanistic Model of Material Removal in Magnetorheological Finishing (MRF) F.J. Chen, S.H. Yin, J.W. Yu, H. Ohmori, W.M. Lin and Y. Uehara	384
A Study of Micro Machining with Instantaneous Tiny-Grinding Wheel Based on the Fe_3O_4 Magnetorheological Fluid J.B. Lu, Q.S. Yan, J. Yu, H. Tian and W.Q. Gao	389
Theoretic Analysis and Experimental Research on Barrel Finishing Uniformity of Crank Shafts with Larger Size W.H. Li, S.Q. Yang and S.C. Yang	394
Surface Waviness Analysis for Axisymmetric Aspheric Lens in Precision Grinding Z.Z. Wang and Y.B. Guo	399
Effect of Nozzle Type and Abrasive on Machinability in Micro Abrasive Air Jet Machining of Glass J.M. Fan, C.Y. Wang, J. Wang and G.S. Luo	404
Fabrication of WC-6Co-1.5Al (wt%) Hardmetal by High Energy Milling and Electrical Current Sintering X.Q. Li, Y.Y. Li, Y. Long, M. Shao and J.B. Zhang	409
Study on Dynamical Characteristics of Catenary Transformer in Gear Honing S.Y. Wang, M. Lv and G. Ya	414
Ultrasonic Machining Aided Tool Rotation of Sintered NdFeB Magnet L. Li, D. Wang, Z.W. Niu, Z.Y. Li and G.M. Yuan	420
Experimental Investigation of Intermittent Rotary Ultrasonic Machining W.M. Zeng, Z.C. Li, X.P. Xu, Z.J. Pei, J.D. Liu and J. Pi	425
Modeling of Material Removal Rate in Two-Dimensional Ultrasonic Grinding Complex Ceramics G.F. Gao, B. Zhao, Q.H. Kong and C.S. Liu	431
Research on Design and Manufacture of Ultrasonic-Vibration-Based Gear-Honing Device M. Lv, L. Ma, G.X. Liang and Y. Zhang	436
Injection of Thermoplastic Polyurethane to Fix Diamond Beads on Wire Saws H. Guo, X.S. Wu, Y.J. Zhang, Y.X. Chen and X.P. Xu	441
Researching and Manufacturing of Endless Diamond Wire Saws and the Cutting Experiment W. Gao, B.J. Ma, T.K. Cao and Z.C. Liu	445

Study on Removal Mechanism of Fixed-Abrasive Diamond Wire Saw Slicing Monocrystalline Silicon Y.F. Gao, P.Q. Ge and Z.J. Hou	450
The Numerical Analysis on Action Mechanism of Slurry in Free Abrasive Wiresaw Slicing P.Q. Ge, B. Sang and Y.F. Gao	455
Research on Cryogenic Pneumatic Mist Jet Impinging Cooling and Lubricating of Grinding Processes Q.L. An, Y.C. Fu and J.H. Xu	460
Two Domensional Simulation of Velocity Field of Two-Phase Flow for Gas and Solid in the Abrasive Air Jet Nozzle C.Z. Huang, R.G. Hou, Z.W. Liu, Q.L. Li and H.T. Zhu	465
Simulation of the Gas-Liquid-Solid Three-Phase Flow Velocity Field Outside the Abrasive Water Jet(AWJ) Rectangle Nozzle and Ellipse Nozzle R.G. Hou, C.Z. Huang, L. Li, Z.W. Niu and Z.Y. Li	470
The Modeling and Finite Elements Simulation for Pressure Field of Abrasive Jet Precision Finishing With Grinding Wheel as Restraint S.X. Yuan, X.Y. Liu, G.Q. Cai and J.P. Shao	474
Real-Time Measurement and Compensation for Wheel Wear in Curve Grinding Based on Image Processing Method Y.M. Luo and D.J. Hu	479
Fractal Tool-Path Planning for Free-Form Surface Polishing System Y.H. Li, J.C. Feng and Y.H. Wang	484
Apply Image Registration to the Wear Measurement and Analysis of Different PVD-Coating Drills Y.C. Chiou and Y.T. Liang	489
Nonlinearity Analysis and Wavelet Package Transform of Measured Chatter Vibrations in Grinding Process Q.K. Han and B.C. Wen	494
Detection of Grinding Surface's Quality Based on Image Technique X.L. Liu, C.Y. Wu, Y.Z. Liu, F.G. Yan, Y.F. Li and P. Wang	499
A Fundamental Study on the Digital Recognition of Grinding Wheel J.F. Gong and X.P. Xu	504
Analysis and Simulation of Grinding Wheel Surface Topography B. Lin and X.Y. Huang	509
Evaluation and Measurement of 3D Form Errors of Ground Curve Surface J. Xie, J.L. Guo and J. Xu	513
Study on Remote Control and Fault Diagnosis for Ultrahigh Speed Grinding W.S. Wang, T.B. Yu, X.Y. Jiang and J.Y. Yang	518
3D Fractal Analysis of Ultra Precision Grinding Influencing on the Surface Topography of Brittle Material M.J. Chen, Q.L. Pang, J.H. Wang and K. Cheng	523
Grinding Process Fuzzy Control on CNC Tool Grinder J. Kang, C.J. Feng, H.Y. Hu and Q. Shao	528
Experiment on Dynamics of the Hybrid Polishing Kinematics Machine Tool with Clearance Based on the Flexible Multi-Body Systems M. Yu and Y.M. Zhang	533
Structural Parameter Optimal Design of a 3-TPS Parallel Grinding Machine Tool Based on Stiffness L. Zhao, Y.D. Gong and G.Q. Cai	538
Study on a Grinding Quality Assessing Method Based on Fuzzy Decision Combined with Analytic Hierarchy Process (AHP) X.L. Shi, G.J. Liu, Q. Wang and R.K. Kang	543
The Experimental Study of Phase Transformation Heat—Transfer in Simulation of Grinding of Ti Alloy J.L. Ren, W. Li, H. Hang and X.Y. Guan	548
On Programming for NC Grinding of Grooved Cam with Discretional Plane Curve Profile Z.Q. Zhang, Y.C. Ge, Z.D. Zheng and S.B. Chen	554

Technology Improvement and Parameter Optimization on the Electroplating Superhard Grinding Material	
Y.W. Wang, Y.Z. Liu, X.L. Liu, G.B. Wang and H.C. Deng	559
Research on Design Knowledge Expression Method of Abrasive Machine Tool Based on Axiomatic Design	
Y.X. Feng, B. Zheng, Z. Wei and J.R. Tan	564
Research on Thermal Error Compensation Technology of Grinding Machine Based on Neural Networks	
Q.J. Guo, J.G. Yang and X.N. Qi	569
Development of the 6-Axles CNC Abrasive Belt Grinding Machine	
Z. Huang, Y. Huang, M.D. Zhang and X.D. Guo	574