## **Table of Contents**

## **Preface and Organizing Committees**

## **Chapter 1: Polymer Materials and Composites, Preparation and Technologies**

Preparation and Evaluation of Molecular Imprinted Polymers of Erythromycin G.L. Gong, S. Chen and H. Li	3
The Preparation of Polypropylene/Polyvinyl Alcohol Ultra-Fine Fibers Using Melt Electrospinning Method	
H.Y. Li, Y.M. Ding, Y. Liu, Y.C. Zhang and W.M. Yang	8
<b>Liquid-State Synthesis and Properties of Fluorescent Conducting Polymers:</b> α, βi-SiW11AIIII/Polyaniline W.L. Yang, Q.W. Wang and R.H. Ma	13
Flame Retardancy Research of Rubber Powder Modified Asphalt C.S. Wang and X.W. Li	19
The Finite Analysis and Optimization of Head Runner of Rubber Sheeting Extruder Y. Yu, J. Wang, Y.G. Gong and B.Y. Lv	25
The Gas Barrier Property and Structure of Rubber Nano-Laminated Composites L. Qin, Y.X. Liu, Y.M. Ding, Z.W. Jiao and W.M. Yang	30
Experimental Study on Falling Process of Melt Electrospinning Fiber Y. Liu, Z.X. Liu, L. Deng, Y. An, X.T. He, Y.C. Zhang and W.M. Yang	36
Research on Properties of AROPOL G102 / Clay Nanocomposites G.Y. Lin, X.C. Mu, X.L. Wang and C.S. Wang	41
Study on the Influences of Ultrasonic Conditions on the Dispersion of Multi-Walled Carbon Nanotubes in Reinforced Epoxy Y.M. Ding, J.Q. Wang, Y. An, J.B. Shao, K. Ma and Y.C. Zhang	47
Study of the Mathematical Model for Online Predicting Mix Mooney Viscosity on the Rubber Open Mill X.K. Zeng, C.H. Yang, Z.S. Song and S.H. Zhao	54
FEA of Flow Fluid of Six-Wing Synchronous Varying Clearance Rotor L. Guo, C.S. Wang and H.G. Bian	59
Effects of Gate Locations on the Tensile Strength of Injection Molded Weld Lines Y.M. Ding, X.H. Wang, P.C. Xie, Y.C. Zhang and W.M. Yang	64
Numerical Simulation Research of Precision Injection Molding Control Method Based on P-V-T Properties of Polymers P.C. Xie, X.L. Guo, G. Gou, Y.M. Ding, Y.C. Zhang and W.M. Yang	70
The Experiment Measuring Method of Polymer Melt Bulk Modulus by PVT Principle H. Xu, K. Han, Y. Liu and D.M. Wu	75
Numerical Simulation on Dispersive Mixing of Solid Powders/Polymer Matrix in Two-Rotor Mixer	
Y. An, Y.M. Ding, J.Q. Wang, K. Ma and W.M. Yang	80
Experimental Research on the Mechanical Properties of Rubbers under Different Curing Pressures T. Li, G.Z. Yang, W. Zhang and Q.L. Li	86
Study of the Mathematical Model for Online Predicting Dispersion on the Rubber Open	
Mill X.K. Zeng, S.H. Zhao, N. Ren, D. Wang and C.H. Yang	91
Flow Analysis of the Die and the Torsional Multiplying Element in Mould Based on ANSYS C.J. Yuan, P.C. Xie, Y. Zhong, Y.M. Ding, Y.C. Zhang and W.M. Yang	95
Numerical Study on Heat Transfer Enhancement Performence of the Helical Blade Rotors Z. Zhang, H. Yan, Y.M. Ding, C.F. Guan and W.M. Yang	101
Analysis on Modifying Asphalt by Rubber Powder H.G. Bian, Y.J. Wu and C.S. Wang	107

Comparative Study of the Low-Temperature Single Step Mixing and Multi-Stage Process Mixing C.S. Wang, G.Z. Song, S.H. Zhao, N. Ren and D. Wang	113
Experimental Analysis of the Damage Zone around Crack Tip for Rubberlike Materials under Mode-I Fracture Condition	110
X.L. Li, X.J. Li, J.B. Sang, Y.H. Qie, Y.P. Tu and C.B. Zhang	119
Study on Structure and Properties of Polysulfone Membranes Using Ionic Liquid [n-C <sub>16</sub> mim][BF <sub>4</sub> ] as a New Structure-Controlled Additive Y.Y. Ding, Y.M. Zhao, C.Z. Zheng and D.H. Tu	125
Numerical Simulation of the Effect of Particle Random Spatial Distribution on the Thermal Conductivity of Composites	120
X.G. Zhang, Y.J. Ji, S.G. Wang and X. Li  Research on the Preparation of the Low Density Material with High Volume Filling Rate of	130
Phenolic Hollow Microsphere  X.T. He, J.B. Shao, Y. An, K. Ma, J.Q. Wang and W.M. Yang	135
Study on Transient Heat Transfer of Micro-Injection Molded Structures Based on the Finite Element Method X.H. Wang, P.C. Xie, P.P. Zhang, Y.C. Zhang and W.M. Yang	141
Thermal Conductivity of EPDM Rubber Filled with Modified Nano-AlN	171
L.X. Ma, N. Zhang, G. Yang and Y. He	146
Research on the Elasticity Modulus of Short Glass Fiber / Thermoplastic Polyurethane (SGF-TPU) Composites J.Y. He, Y.M. Ding, Z.C. Xue and W.M. Yang	152
Contribution of Carbon Black to Thermal Conductivity of Natural Rubber J.P. Song and L.X. Ma	158
The Effect of AIREBO on Thermal Conductivity of EPDM Networks L.X. Ma, G. Yang, Y.Z. Tang and Y. He	164
Thermal Conductivities and Mechanical Properties of EPDM Filled with Modified Carbon Nanotubes L.X. Ma, L. Ma and Y. He	169
Finite-Element Analysis of Rotor in the Rubber Continuous Plasticator	107
P. Fu, H.L. Zhang and C.S. Wang	174
Chapter 2: Polymer Manufacturing and Industry Technologies	
Analysis of the Energy Saving Methods in Tire Factory Z.H. Li, Z. Li and T. Ma	181
Effects of Different Process Parameters on Rubber Mixing in Tandem Internal Mixer C.S. Wang and M. Zhang	186
Analysis of Deflection of Short Fiber Rubber Sheeting Mill Roll D.S. Liu, Y. Yu, Z.W. Zong and B.Y. Lv	192
Coated Composite Crosstie Mold Structure Design Used for Experiment with Inventor, Moldflow and Ansys Y.G. Gong, Z.W. Zong, Y. Yu and B.Y. Lv	196
Modal Analysis of the Frame of YlJ Series Tire Uniformity Testing Machine Z.Y. Duan, B. Song, G.Y. Song, Z.Y. Lu and B.L. Hang	201
Numerical Study of Boiler Feed Water Deoxygenation Using Hollow Fiber Membrane Contactor	206
X.G. Zhang and S.G. Wang  Influence of Helical Grooved Structure on Mixing Process in a Single Screw Extruder	206
J. Wang	212
New-Type Vacuumizing Flat Vulcanizing Machine Structure Design and Experimental Research	
L. Guo, C.S. Wang, Q.K. Liu and D.J. Su	218
Experimental Study on Rubber Open Mill Mixing Process Parameters X.K. Zeng, S. An, D. Wang, G.Z. Song and N. Ren	223

Melt Behavior Simulation on the Planetary Gear Pump Used for Polymer Differential Injection Molding (DIM)	
P.P. Zhang, P.C. Xie, L.L. Miao, X.H. Wang and W.M. Yang	228
Optimization of Staggered Tooth of Sleeper Molds Based on FEM J. Wang, Y.G. Gong, D.S. Liu and B.Y. Lv	234
Optimization of the Injection Molding Process Parameters Based on Moldflow and Orthogonal Experiment	
Y. Nie, H.M. Zhang and J.T. Niu	239
Experimental Research of Granular Silica Pneumatic Conveying System in Tyre Factory Y. Li, H.J. Li and G. Li	244
Finite Element Analysis for Effect of Double Firm Rings on Grounding Performance of Aircraft Tire	2.50
G. Zhang, Z.W. Jiao, Y. Liu, Y.X. Liu, H. Yan, Y.M. Ding and W.M. Yang  The Portormance Analysis and Possesseh shout a Type of New Tubular Polt	250
The Performance Analysis and Research about a Type of New Tubular Belt W.F. Zhang, C.S. Wang and F.X. Zhang	255
New Rotors Configurations in the Rubber Continuous Mixer C.S. Wang and H.L. Zhang	260
The Numerical Simulation of Injection Coated Sleeper Z.W. Zong, D.S. Liu, J. Wang and B.Y. Lv	265
Forming Process of Segment-Narrow-Bars on the PCR Mold H.M. Hu, D.B. Yin and H. Li	270
Study on Cross Linking Eliminating and Regeneration Mechanism of Scrap Rubber L. Guo, C.S. Wang, T.K. Shan and Y.W. Tao	274
Dynamic Simulation and Analysis of Different Phase Synchronous Rotor Mixing Process X.J. Mu, X.W. Li and N. Duan	279
The Research on the Heating Time of Rotational Molding L. Qin, Y.M. Ding, Z.W. Jiao, Y.X. Liu and W.M. Yang	285
EDM Surface Strengthening Research on Rubber Mold J. Liu, Z.J. Liu and M. Zhang	291
Finite Element Analysis for Mechanical Properties of a New Section Contour Tire Z.W. Jiao, P. Zhao, Y.X. Liu, Y.C. Zhang and W.M. Yang	296
Experimental Study on the Rubber Continuous Plasticator P. Fu, H.L. Zhang and C.S. Wang	302
Research on the Optimal Rotor Speed of the Mixing-Molding Integrative Machine L. Li, S.H. Sun and Z.L. Wang	307
Numerical Investigation of Mixing Properties of Continuous Mixer with New-Type Rotors Y. An, K. Ma, J.Q. Wang, X.T. He, J.B. Shao and Y.M. Ding	313
<b>Experimental Study on Tire Curing Process by Employing Variable Temperature Method</b> Q.L. Li, D.X. Du, G.Z. Yang and T. Li	319
Application of a New Twin-Screw Extruder to the Waste Tire Regeneration L. Guo, Q.K. Liu and C.S. Wang	326
Numerical Simulation and Analysis of 3D Flow Field in New Different-Speed Mixer Y.L. Zhang and Y. Wu	331
A Numerical Investigation on Temperature Field in the Oven of a Rotational Molding Machine	
C.F. Guan, W. Peng, L. Qin, Y.C. Zhang and W.M. Yang	336
Influence of Relative Humidity on the Moisture Evaporation of Monocomponent Water-Borne Sealer for Wooden Furniture under Forced Drying Condition M. Wang, Z.G. Lu, W.D. Jia, H.Y. Zhao and F.S. Wang	341
Experiment Research on Single Step Mixing at Low Temperature C.S. Wang, N. Ren, G.Z. Song, S. An and S.H. Zhao	347
<b>Development of Inner Mould Direct-Pressure Tire Vulcanization Technology Equipment</b> J.Y. Zhang, Z.W. Jiao, Y.X. Liu, Y.C. Zhang and W.M. Yang	351
The Simulation of Rolling Lamination Forming for a Light Conveyor Base on ANSYS/LS-DYNA	
J.Y. He, Y.M. Ding, Z.C. Xue, F. Yang, H.L. Yu and W.M. Yang	357

Simulation Study for the Effect of Oil Viscosityon Performance of Full Metal Single Screw Pump	
J.F. Wu, X. Wei, X.Z. Yang and Y. Yu	362
Simulation Study for the Effects of Clearance Volume on Full Metal Single Screw Pump Performance	
J.F. Wu, F.G. Meng, X.P. Zhang and Y. Yu	368
The Design of Special Spatial Cam Mechanism for Extruder Z.M. Meng, L.X. Ji and C. Ren	374
Effect of Different Parking Time on Mixing Rubber's Physical Properties in Two-Stage Mixing Process	
C.S. Wang and W.W. Liu	380
Simulation Study for the Effects of Rotational Speed on Performance of Full Metal Single	
Screw Pump J.F. Wu, J.B. Lan, F.G. Meng, X.P. Zhang and Y. Yu	384
Application of Numerical Simulation in Optimizing Rubber Injection Molding Process H.M. Zhang, J.T. Niu and L.L. Dong	390
Research on Fill Factor of Internal Mixers F.Q. Yang, G.Y. Song and C.S. Wang	395
Experimental Research on the Influence of the Open Mill Mixing Process Technological	
Parameters on the Mixing Quality X.K. Zeng, D. Wang, S. An, S.H. Zhao and G.Z. Song	400
A.R. Zeng, D. Wang, S. An, S.H. Zhao and G.Z. Song	400
Chapter 3: Miscellaneous Topics	
Precision Parts Cleaning Equipment Using Supercritical Carbon Dioxide and Ultrasonic D.D. Hu, Z.K. Ning, B. Han, H. Zhang and G.R. Gao	407
Proper Index of Foam Statics Characteristics on Predicting Foam Dynamics Behavior in	
Porous Media Y.G. Li, D.C. Geng, F.H. Zhang and D.X. Du	411
Analysis of the Ring Die of Biomass Energy Molding Machine Based on ANSYS	711
B.C. Liu, Y.X. Shang, Y.M. Xu and X.M. Liang	417
Finite Element Analysis for Effect of Different Carcass on Performance of Aircraft Tire Z.W. Jiao, G. Zhang, Y. Liu, Y.X. Liu, H. Yan, Y.M. Ding and W.M. Yang	422
Hot Probe Method for Measuring Thermal Conductivity of Copper Nano-Particles/Paraffin Composite Phase Change Materials Y. Zhou, Y. Wang, J.H. ZHang and Q.L. Li	428
Defects Analysis of Liquefied Gas Tankers	120
B.L. Hang, W.C. Li and W.B. Huang	435
SCF Preparation of Drug Particle Using Size Adjustable Nozzle D.D. Hu, M.L. Ding, G.W. Zhu, W.Q. Wang and Z.Q. Zhao	441
Application Research of Pipe Racking System Based on Improved Fuzzy Neural Network PID Control	
J.H. Song, D.W. Cai and X.D. Zhu	448
Numerical Research of Thermal-Pressure Coupling Effect on Blockage Ratio in the Evacuated Tude Transportation System	151
Q.L. Li, W.G. Jia, C.G. Dong and R.X. Duan  Numerical Study of Circular Tube inserted Arc Belt on Fluid Flow and Heat Transfer	454
under Laminar Flow D.H. Zhang and J. Gao	460
Experimental Study on the Mechanical Properties of Two Sandwich Structure Composite	
Materials C.S. Wang and Q.K. Liu	466
Numerical Study on Film Foam Flow Characteristics in a Straight Duct D.X. Du, F.H. Zhang, D.C. Geng and Y.G. Li	472
<b>The Oil Temperature Controlling of Hydraulic Pump Performance Test-System</b> B. Sun, X.M. Zhang and K.G. Sun	478
Air Dynamics Characteristics Analysis of Air Splicer J.Z. Wang, G.Z. Zhou, L. Li and D.G. Chang	483

The Selection of Filter Technical Parameters in Carbon Black Pneumatic Conveying System Z.H. Li, Z.X. Peng and Y.J. Zhou	490
Modal Analysis of the Cylinder Mechanism Based on ANSYS Workbench D.G. Chang, H.Y. Dou, F.Q. Yang and R. Zong	496
Project Management's Changes Based on PDM in the Model Solution H.M. Cai and C.K. Liu	501
<b>Design of Multi-Grade Centroid Adjusting Mechanism for Simulation Inspection Device</b> L.X. Sun, X.Y. Lv, Z.G. Zhang, S.Y. Jiang and Y. Xu	506
<b>Axial Mechanical Characteristics Analysis of Elongational Pneumatic Artificial Muscle</b> G.L. Zhang and D.X. Geng	510
Identification of Location and Orientation for Terminal Blocks Based on Template Matching	
Y.X. Cui, Y. Li, H.J. Wang and X.L. Wang	515
Jacket Damage Identification Based on ANSYS Design Optimization X.B. Luo and Y. Zhang	521
Research of Automobile Tire Vertical Stiffness Optimization Method on the Basis of ADAMS/Car	527
Z.P. Wang, Z. Yu and K. Li	527
Experimental Study on Ice Melting with Different Temperatures and Specific Areas Y.Y. Wang, N. Qin, X. Yan and T.T. Niu	533
The Effect of Ni-P Alloy Pre-Plating on the Performance of Ni-P/Ni-P-PTFE Composite Coatings	
J.Y. Hou, S.R. Wang and Z.W. Zhou	537
<b>Analysis of Thermal Field of Gear Driving with Meshed Medium Belt</b> Z.M. Fan, L. Gao, H.M. Li and R.C. Liu	542
Simulation of Circular Tubes Fitted with V Cut and Square Cut Rotors P. Jiang, H. Yan, Z. Zhang, Y.M. Ding and W.M. Yang	547
Structural Modification and Airflow Optimization of Bag-Type Collector Based on Flue-	
Gas Rich-Lean Separation R. Li, B.Z. Zhang and B. Zhang	553
Automatic Generation of the Word in Tire Mold Side Plate Based on Font Vectorization H.M. Hu, H. Li and D.B. Yin	559
Fatigue Analysis of Linear Vibrating Screen with Different Surface Roughness Z.R. Zhang and J. Xu	564
Design and Research on Tower Escape Apparatus Based on the Principle of Escapement Mechanism	5.00
K.B. Wang, S.C. Qin, K.M. Liu and X.L. Chen	568
Research on the Vector Measure Method of Coordinate Measuring Machine Z.L. Han and M.X. Yuan	572
Mechanical Characteristics Analysis of Steel Bracing Structure of Porous Fences Y. Jiao, W.B. Huang and Z.Y. Duan	576
Research on the Self-Cleaning Sole Cleaner Z.G. Zhang, L.X. Sun, X.Y. Liu, J.Y. Li and X.Y. Lv	581
<b>Design and Preparation of Al<sub>2</sub>O<sub>3</sub>/TiC/CaF<sub>2</sub> Self-Lubricating Ceramic Tool</b> T.K. Cao, C.S. Shan and J.P. Ge	585
Detection and Location of Underwater Pipeline Based on Mathematical Morphology for an AUV	
X.L. Wang, L. Li and Y.X. Cui	591
Performance Study of Solar Chimney Power Plant System with a Sloped Collector Q.L. Li, X.Y. Fan, X. Xin, J. Chao and Y. Zhou	597
An Anti-Occlusion Algorithm for Object Tracking Y.H. Huang, H.L. Chong, Z.H. Li, Y.P. Zhang, N. Hu and X.M. Jia	604
Virtual Prototype Analysis for the Manipulator of Punching Machine D.G. Chang, G.Z. Zhou, H.Y. Dou and C.C. Wang	609
The Comparison of CFD Flow Field between Slope Solar Energy Power Plant and Traditional Solar Chimney Power Generating Equipment	£1.4
Q.L. Li, X.Q. Xie, J. Chao, X. Xin and Y. Zhou	614

Springback of TRIP Steels under Varying Blank Holder Force T.K. Shan and L. Liu	620
The no Alarm Faults Examples for Maintenance on a Combining CNC Machine Tool of Turning and Grinding S.J. Guan and K. Yang	626
The Design of Workpiece Hydraulic Clamping System of a Special CNC Machine Tool for Guide Disc K. Yang, S.J. Guan and Z.Y. Pan	630
Test Research for Thermal Protective Properties of Mobile Refuge Chamber D.G. Chang, M.M. Du and X.J. Gao	635
Terahertz Time-Domain Spectroscopy Technology and its Application in the Field of Pesticide Y.H. Huang, M. Hu, G.H. He and W.L. Liu	640
The Research Progress on Pressure Drop of Rotating Packed Bed D.D. Hu, G.W. Zhu and W.Y. Shan	646
The Study of Feature Extraction Based on the Optimal Threshold Segmentation Algorithm X. Ren and L.X. Ma	652
Numerical Analysis for Thermal-Chemical-Stress Coupling in Deep Rock Creep Properties Y.C. Wang, Y. Li and J.G. Li	657
Design of Open-Architecture Gantry Milling NC System Based on Motion Control Card D. Chen	663
The Tank Bottom Safety Detection Based on Acoustic Emission Technology Y.H. Huang, J.X. Ma, Z.H. Li, Y.P. Zhang and X.D. Han	667
Numerical Simulation of Counter-Current Flow Field in Double Packing Rotating Packed Bed D.D. Hu, W.Y. Shan and G.W. Zhu	672
Design of Human Tracking Algorithm Based on Improved Camshift Y.H. Huang, J.X. Ma, X.D. Han, N. Hu and X.M. Jia	677
Research on Simulation Inspection Detector L.X. Sun, K.B. Wang, Z.G. Zhang, S.Y. Jiang and J.B. Jia	683
The Meshing of the Fan Blade of Scenery Tower Power Generation Device W.M. Yang, W.J. Bai, M.M. Du and T.K. Shan	688
Finite Element Static Deformation Analysis of the Cylinder F.Q. Yang, H.T. Zhang, D.G. Chang and R. Zong	692
Finite Element Analysis and Research of Beam Based on Workbench T.T. Niu, S.C. Wang and S.N. Luan	696