

Table of Contents

Preface, Organization and Committees

Chapter 1: Process Equipment

Testing Device for High-Pressure Cylinder Based on Virtual Instrument F. Chen, Y.J. Yue and X.J. Du	3
Simulation Research on Tooth Root Dynamic Stress of Marine Helical Gear Meshing Impact Y.B. Zhang, H.Q. Yuan and M.X. Liang	7
Modeling and Design for a Intelligent Three-Level Boost Converter D.Y. Lu, C.W. Li and J.T. Shi	11
Flow Field Study of Sodium Aluminate Solution Slurry in an Unagitated Precipitation Tank by CFD Simulation Y.F. Ding, X.D. Su, D.Q. Hu, L. He and F. Wang	16
Affection of High Sulfur and Naphthenic Acid Crude Oil Acted on Refinery Equipment Z.F. Wang	21
Numerical Analysis of High Power Marine Diesel Engine Main Bearing Load and Lubricating Properties X.X. Zhao, A.J. Huang and Z.X. Hu	25
Investigation on Residual Strength of Airplane Plate with Smooth Circular Hole W.W. Yao, P. Zhou, S.L. Hou and Y.K. Gao	31
Research on Acoustic Emission Signal Processing of Concrete Beam in Fracture Experiment Based on the HHT W. Li, Y. Yang and P. Jiang	35
The Application of ROV for the Subsea Christmas Tree Installation in the LiWan3-1 Deepwater Oilfield J.G. Zhang, H. Zheng, J.G. Bu and C.G. Li	39
Numerical Simulation of Flotation Circuit for Kakoxene Ore Processing Y.J. Zhang, M. Tan, T. Wu and T.R. Feng	43
GLC Coating Improving the Wear Resistance of Aeroengine Bearings in Insufficient Lubrication G.Y. He, X.D. Zhu, W.F. He and Y. Chai	48
Design of an Automatic Cleaning Energy-Saving Technology for Manganese Sulfate Continuous Production Crystallizer T.X. Yu, W.Y. Zhou, T.L. Yu, D.Q. Peng and L. Ye	52
Oil Spill Buoys Research for the Oil Spill Accidents Emergency P. Zhao and D. Cui	57
Investigation on Acoustic Emission Characteristics from Q345R during Fatigue Crack Propagation M.Y. Chai, L.C. Li, Y.Q. Li, W.J. Bai and Q. Duan	61
Research on the Optimal Design of a Pilot Valve Controlling Cut-Off Valve J.Y. Qian, H. Zhang, J.K. Wang, A.L. Lu and Z.J. Jin	65
Finite Element Analysis in Dynamic Conditions of Bridge Crane Beam Y.B. He, Y. Zhang, B.K. Yang, S.W. Liu and D.F. Chen	70
Corrosion of Tail Heated Surface Tube under Flue Gas Medium in LNG Power Station HRSG Z.B. Chen, Y.H. Chen, B.Y. Li, X.Y. Zeng, Y.S. Lv and X. Liu	74
Analysis of Failure Mode and Construction Improvement of Spray Tubes in Boiler Desuperheater Z.B. Chen, M.S. Chi, L.F. Zheng, J.X. Shen and H.H. Lei	79
Parameters Optimization of Linear Compressor for Refrigerator Z.H. Li, Y. Liu and Y. Zhong	84

Numerical Analysis of the Performance of Dual-Tank with Movable Baffle for Heat Pump Water Heater	
L.Z. Yang, J. Wu, Y.C. Hu and R.H. Hong	88
CFD Analysis and Experimental Verification of Multi-Stage Centrifugal Pump with Multi-Outlet Options	
S. Huang, G.W. Ou, Z.G. Song and P. Wang	94
Failure Analysis and Transformation of Hydrogen Compressor Dry Gas Seal	
H. Cao, Y. Liu and C.J. Lin	98
Cause Analysis and Processing of Propylene Gas Compressor Bearing Vibration	
H. Cao, Y. Liu and C.J. Lin	102
Reform of Mechanical Shaft Sealing Self-Flush System of Petrochemical Hot Oil Centrifugal Pump	
Y. Liu, J.L. Ren and H. Cao	106
Stress Calculation of a Spherical Tank on Settled Ground Based on FEM	
H.L. Gao, W.J. Li and Z.H. Li	110
Stress Calculation of Pillars in Spherical Tank on Settled Ground	
H.L. Gao, W.J. Li and F.Z. Deng	114
A Reformative Simulation Method of Motor Pole Core Vibration Characteristics	
T.H. Ding, Y.H. Chen and L. Tian	118
Structure Optimization Design of Axial Flow Check Valve	
H.S. Su, G.L. Yang, L.Q. Zhang, M.Y. Xu and R.N. Li	124
Study of Crack Initiation and Propagation in TBCs by Experiments and Extended Finite Element Method	
J.X. Su, Z.H. Ji, Z.Y. Han and H. Zhang	129
Research on Arc Fault Characteristics and Detection Method	
S.H. Ma, J.Q. Bao, Z.Y. Cai and C.Y. Meng	133
Arc Fault Recognition Method Using Box Dimension and Information Dimension as Discriminating Features	
S.H. Ma, J.Q. Bao, Z.Y. Cai and J.W. Guo	137
Fractal Study on Rabinowitch Fluid Flow in a Capillary	
M.J. Yun	141
Identification Method of Low-Voltage Series Arc Fault Based on Harmonic Component Relative Change Coefficient	
S.H. Ma, J.W. Guo and J.Q. Bao	144
Stress Distribution Analysis on Alloy Layer of High Power Marine Diesel Engine Bearing Bush	
X.X. Zhao, Z.X. Hu and A.J. Huang	148
Diagnosis of Bearing Based on Probability Neural Network	
Y.H. Ao, B. Cao and B.S. Wang	153
Research on Temperature and Deformation Distributions of Scroll Compressor Plates	
Y.Y. Zhao, Y.X. Liu, Q.C. Yang, L. Wang and L.S. Li	157
Analysis of Flow Field in the KYF Flotation Cell by CFD	
G.G. Dong, M. Zhang, L.J. Yang and F. Wu	161
Effects of Heat Leakage and Internal Irreversibility on Quality Factor of Thermoacoustic System	
J.H. Fei, F. Wu and T. Wang	166
Research on Ultrasonic Testing Technology for Polyethylene Pipe Hot-Melting Welded Joints	
F.Y. Xia, W.Z. Li and Y.L. Liu	170
The Stress Calculating and Analysis of the Second HP Turbine Disc of a Certain Type of Aeroengine	
K.J. Xu, Y.Q. Wang, Y.R. Xia and M.M. Jia	176
Fractal Analysis of Effective Permeability for Meter Fluid	
M.J. Yun	181
Analysis of Optimal Autofrettage Pressure on CFRP Pressure Vessels Using ANSYS	
D.X. Liu, L. Liang and X.L. Bao	184
Numerical Analysis of Interpolation Vibration Spring Heat Exchange Tubes under Pulse Flow	
J.M. Xu, X.X. Hu and K. Peng	189

Study and Prediction of Flow and Heat Transfer Characteristics in Tube with Wire Coil Inserts of Heat Exchangers T. Yi, K. Peng and J.M. Xu	195
Flow Field Test and Analysis of KYF Flotation Cell by PIV S.X. Shi, Y. Yu, W.W. Yang and H.X. Zhou	200
Numerical Simulation of Gas-Liquid Two-Phase Flow in Multi-Impeller Pre-Oxidation Reactor M.H. Lai, D. Chen, D.F. Han and Q. Li	205
Corrosion Behavior for Water Wall Tube Material of 600MW Supercritical Thermal Power Units G.H. Lu, X.C. Jiao, C.R. Ma, W. Su, T.S. Chen and Z.P. Zhu	211
Research on Energy-Saving Technology for Salt Solution Heat Pump Evaporators T.L. Yu, T.X. Yu, D.Q. Peng, L. Chen, X.Y. Feng, Z.K. Zhang and X.M. Yu	216
The Fluid Field Analysis of Cyclone Desander C. Yu and G. Wang	222
Cold Experimental Study on Furnace Slag of Opposite Firing Boiler Using Swirling Combustion C.Y. Wang, M. Li, Y.S. Zhang, L. Li, L.S. Sun and D.Y. Xie	227
Experimental Research of Acoustic Emission Features of Waveguide Rod in the Oil F.P. Guo, D.C. Wang, W. Liu and Z.H. Duan	231
Development and Experimental Research of Two-Way Impact Pneumatic Cylinder C.H. Gai, C.G. Wang and X.H. Xie	236
Compensation Capacity Selection and Performance Improve for SVC S. Liu, Y.H. Xu, J.H. Wang and C.Y. Yang	242
Acoustic Emission Monitoring of Low Carbon Steel Corrosion inside and outside the Comparative Study W. Li, S.F. Wang and X. Jia	246
Modeling for Lithium Iron Phosphate Battery and its Simulation in PSCAD L. Qi, Y.Q. Zhu, Z.Y. Wang and C.P. Fu	250
Development of Movement Crosstalk Removal Method for 3D Elliptical Vibration Cutting J.Q. Lin, J. Yue, X.P. Gao and T.H. Ran	254

Chapter 2: Mechatronics, Control and Automation

Study on Fuzzy-PID Control Simulation of Diesel Engines Electronic Governor Y.Q. Li, Z.G. Yao and Y.L. Xu	263
CNC Servo System Base on PMSM M.X. Zeng and W. Ouyang	267
Optimal Scheduling of Compressors Considering Linepack Storage in a Pipeline Network G.T. Wang, C. Zheng and A. Halimah	271
Fuzzy Controller of Voltage Regulator System BP Neural Network Model Design and Simulation W.Y. Lu	277
Research and Application of Compound CNC Five Axis Five Linkage Milling-Grinding-All-in-One Machine Z.Y. Zhong, Z.Y. Guo, H. Lei and B. Kuang	281
The Correction Methods of Morphology on Uneven Lighting Pavement Image S.F. Jin, Y.B. Hu and M.R. Tian	286
Robot Grasp Pattern Recognition Based on Wavlet and BP Neural Network J.J. Chen and T. Xiang	290
A New Stabilizing Controller Design Based on the Wireless Networked Control System X.H. Guo	294
A Novel Dual-Galvanometers Control Card Z. Wang	299
Theoretical Analysis of a New Intrinsic Fabry-Perot Interferometric Fiber Pressure Sensor Structure N. Wang, J.B. Fu and X.X. Li	303

Nonlinear Control of SVG Based on Hamiltonian Energy Theory Y.B. Wei and W.J. Yang	307
Power Feedward Strategy of Grid-Connected Inverter Based on Direct Power Decoupling C.P. Fu and Y.Q. Zhu	311
The Computer Projection Remote Page-Turner Controller Design Based on the HT82M99E MCU J.P. Cao, C.H. Li and G.D. Jiang	315
The Development of Environment-Friendly and Energy-Saving Engineering Machinery General Oil F.C. Huang, X.Z. Tang and M.R. Su	321
Design of Calibration System for a Great Quantity of High Precision Scientific Grade CCD Cameras J.H. Tan, P.Y. Li, Y.S. Qu, Y.M. Han, Y.L. Yu and W. Wang	326
Interference-Free and Iso-Parametric Trajectory Generation for the 5-Axis Machining of an Impeller J.B. Wang, K.F. Liu and X.B. Chen	331
Theory Analysis and Performance Optimization of CNC Machine Tool Servo-Driven System S. Wei	337
Implementation and Application between High Stability PC and FPGA Serial Communication Z. Zhang, L.X. Cai and Y.K. Wang	344
The Design of Voice Communication and Data Collection System Based on Double CAN Bus H.D. Li, J.M. Zhang and H.Z. Wang	348
A High Accurate Adaptive Temperature Control Algorithm Based on Fuzzy Reasoning and PID Control T.T. Guo, Q.T. Wang and Q. Shen	352
Design and Application of Motormeter Based on CAN Bus Technology A.J. Yang and Y.X. Liu	356
Study on the Method and Strategy of Stock Control for Automobile Supply Chain J. Liu and Z.G. Liu	360
The Application of Fuzzy Control in the Intelligent Crossroad Traffic Control Z.Q. Xie and B. Liu	366
A Framework of WSN and LabVIEW Based Data Acquisition System for Chemical Equipment Monitoring P.B. Cao, J.Q. Hu, X.B. Chen, Y. Wang and R. Song	370
Ultra High Pressure Control Technology on Small Cavity C.M. Shang, D.M. Zhang and J.F. Fan	376
Research of Body Material on Sensor of Detecting Micro Torque Y. Liu, G.H. Cao, N. Shi, D.F. Li and N. Yu	381

Chapter 3: Material Engineering and Technologies of Material Processing

Study on the Morphologies and Mechanical Properties of PP/EOC/SGF Composites with and without Compatilizers J.N. Yang and A.Q. Xu	387
Study on Intergranular Corrosion of Sensitized 316L Stainless Steel Y.Q. Li, W.J. Bai, S.Q. Pu, X.M. Xie and Q. Duan	391
Study on the Ultraviolet Aging of APMOC Fiber F. Chen, Y.J. Yue, W.X. Sun and Y.Q. Jing	396
Synthesis and Application of Titanate Nanotubes Q.X. Deng, C.Z. Huang, W. Xie, H.C. Xu and M.D. Wei	400
Research on the Influence of Epoxy Resin from Hydrothermal Aging Y.J. Yue, F. Chen, Y. Liu and Y.Q. Jing	403
The Design of Self-Lubricating Ceramic Tool Material T.K. Cao, C.S. Shan and J.P. Ge	407

Synthesis and Characterization of Aminopyridyl -Thiacalix[4]arene Immobilized on Mesoporous Titanium Dioxide and its Application for Heavy Metal Adsorption Q.H. Wu, C.Z. Huang, J.P. Zhang, Q.X. Deng and W. Xie	411
The Corrosion Behavior of Galvanized Steel in Alkaline Soil F.J. Yan, X.G. Li and X.G. Wang	416
Study on the Solidified Microstructures of AZ61 Magnesium Alloys under Electromagnetic Fields Y.H. Li, B. Song and N. Wang	421
A Novel Fluorinated Carbon Material for Primary Lithium Battery J.C. Lu, Z.C. Liu, P. Huang, Q. Fang and M.H. Zhu	427
Synthesis, Characterization and Ring-Opening Polymerization of Macrocyclic Aryl Ketone Oligomers Containing the Phthaloyl Moiety L.S. Hu and Q.Z. Guo	431
Rheological Behavior during Melt Ring-Opening Polymerization of Macrocyclic Aryl Ester Dimer L.S. Hu	435
EMI Shielding Effectiveness of CNTs Composites P. Li, A.S. Low, Y.Y. Shan, G.C. Ong and X.J. Yin	439
Microstructure and Microtexture Evolution during Batch Annealing of Warm-Rolled Ti-IF Steel Sheets F.T. Han, Z.C. Wang, C.N. Jing, X.M. Liu, J. Su and S.Y. Zhang	443
Effects of Sintering Temperature on the Phase Changes of Woodceramics Prepared from Liquefaction Wood D.L. Sun and X.C. Yu	448
Morphology and Field-Effect Mobility Characterization of Planar Five-Ring-Fused Dithiophene-Dione J. Wang	452
A Method to Determine Fracture Toughness Using Berkovich Indenter for Bulk Materials M. He, D.H. Shi, F. Yang, N. Zhang and H.F. Guo	456
Fabrication and Photocatalytic Performance of Titanium Dioxide Nanoparticle/Polymethylmethacrylate S.H. Yan and Y.T. Zhang	461
Graft Polymerization of Acrylic Acid onto Polypropylene Film: Immobilization of Chitosan Nanoparticles onto Grafted Films H.M. Zheng, Y. Cai, M. Zhang and H.B. Li	465
Electrochemical Potential Noise Analysis of 304 Stainless Steel Weld Zone Exposed to Alkaline Solutions by Different Parameters R. Zhao and S.Z. Song	469
Laser Cladding Functionally Graded Composition of Molybdenum Disilicide and Co-Based Alloy J.B. Zhang, D.M. Yu, Z.F. Liang and D. Fan	474
Synthesis and Characterization of Copolymers Consisting of 3-Hexylthiophene and Biphenyl Derivatives F.D. Liu, Y. Zhou and H.Y. Wu	478
The Features of 304 Nitrogen Controlled Stainless Steel during Slow Strain Rate Test by Electrochemical Noise R. Zhao and S.Z. Song	483
Study on Structure and Property of 1560 Nickel Alloy Produced by Electromagnetic Horizontal Continuous Casting Q. Zhang, Z. Cao, Y. Li and J.Z. Cui	487
Production and Developing Trends of Gold Alloys Magnetron Sputtering Target Z. Cao, Q. Zhang and Y. Li	492
Synthesis and Photocatalytic Properties of ZnO-Volcanics Composites A.H. Wang, P. Che, J.M. Liu and G.H. Wang	497
A Spiro [Fluorene-9, 9'-Xanthene]-Based Host Material for Efficient Green and Blue Phosphorescent OLED Y.R. Ni, H.Q. Su, W. Huang, J.F. Zhao, Y. Qian, L.H. Xie, G.H. Xie and Y. Zhao	503
Study on Nonmetal Inclusions in Ultra-Low Oxygen Spring Steel during Process X.D. Wu, R.L. Chen, B. Xiao and Z.Y. Wang	508

Shape-Controlled CeO₂ Nanomaterials Prepared by Hydrothermal Process Y. Tao, Y.X. Tao, Z.H. Su and H.P. Wu	513
Prepare of the New Structure PbTiO₃ Nanowires and the Study of the Reversible Bending J. Wang, J. Li and Y.W. Wang	522
Experimental Study of the Performance of C60 Pavement Concrete X.Y. Du, Z. Li and B. Shao	527
Determination of Orientation Relationship between TiC and Ti₂CS in a Ti-Containing Steel by TEM Q.H. Luo, D.L. Liu and C.Z. Li	531
Corrosion Properties of Al-Modified Austenitic Stainless Steel Prepared by Laser Cladding J.B. Zhang, D.M. Yu and J.L. Xu	536
Photocatalytic Performance of SnO₂ Prepared by Different Precipitants S.T. Huang, J.B. Zhong, J.Z. Li and W. Hu	540
Effect of Higher Order Modes on Creep Buckling of Viscoelastic Plate Y.X. Sun, W. Cheng and L. Xu	544
Study on Texture and Deep Drawability of Ti-IF Steel Sheets Hot-Rolled in Ferrite Region F.T. Han, Z.C. Wang, C.N. Jing, J. Su, X.M. Liu and S.Y. Zhang	551
Microstructure and Mechanical Properties of 22MnB5 Steel with Different Cooling Method H.W. Liu, J.B. Yu and H.Y. Zhao	555
Comparative Study on Wear of Hot-Working Die Steels Q.Y. Zhang, S.Q. Wang and L. Wang	559
First-Principles Calculations of Electronic and Structural Properties of LaN under High Pressure X.C. Yang, F. Liu, X.Y. Luo, H.Y. Lin and J.P. Xiao	563
Self-Assembly Micro-Nanostructures of Discotic Organic Molecules Y.S. Mi, Z. Yang, D. Wang, P.X. Liang and Z.K. Jin	567
Light Power Enhancement of Violet LEDs Using AlGaIn-Based Epitaxial Structure J.S. Yue, Y. Gao, G.H. Zhang and Y. Liu	572
Effect of Welding Heat Input on Grain Size and Microstructure of 316L Stainless Steel Welded Joint L.C. Li, M.Y. Chai, Y.Q. Li, W.J. Bai and Q. Duan	578
Research on On-Line Pre-Hardening Process of 718H Die Steel G.Y. Liu, D.M. Zhu, S.J. Zhang, M.W. Li and S.C. Gong	583

Chapter 4: Related Themes

Experimental Study on Combustion Characteristics of Grease Attached on Oxygen Cylinder in High-Pressure Oxygen G.H. Zeng, L.J. Zhang, G. Tao and L. Zhang	591
Lapping Aspheric Workpiece Using Bending Method C.M. Shang, D.M. Zhang and J.D. Yang	595
Research of Foam Pattern Processing for Lost Foam Casting H.Z. Chen, Z.D. Shan and H.Z. Dong	600
The Optimization of EDM Machining Parameters of Graphite Electrode on BP Neural Network Y.X. Wu and C.Y. Wang	604
Development of Resistance Spot Welding Quality Monitoring Technology Z.W. Wang and X.D. Liu	608
Research of Classification Technology of Cashew Nuts L. Zhang, Q.Z. Zhang and C.Q. Yi	612
Improving Pre-Stack Seismic Data Resolution Based on Inverse Q Filter H.B. Zhang, C.H. Cao, Z.W. Dan, Z.P. Shang, T.C. Li and H. Wan	617
Design for Detection System of Landslides Based on SCM G.Z. Li, C. Liu, G.H. Cao and N. Yu	622
Study on Spare Part Requirement Prediction Model of Aircraft Battle Damage Assessment and Repair Based on Layer Analysis Method W.W. Yao, K.L. Cai, P. Zhou and Y. Li	626

