

Table of Contents

Preface, Committees and Sponsors

Chapter 1: Research on Mechanics and Dynamics of Systems in Mechanical Engineering

| | |
|--|----|
| Dynamic Simulation of the Movement of the Rocket Launch Tower on ADAMS Based on the Material of the Tower J. Zhou, J.S. Ma, Z.X. Sun and C.G. Wu | 3 |
| A Simple Method for Calculating the Bending Modal Frequencies of an Underwater Simply Supported Beam with Hydrodynamic Study R. Tang, D.J. Shang and Q. Li | 7 |
| Study on the Basic Problems of Dynamics by Induction and Generalization Z.Q. Xu and K.G. Qian | 12 |
| Nonlinear Vibration of Functionally Graded Material Cylindrical Shell Based on Reddy's Third-Order Plates and Shells Theory L. Dong, Y.X. Hao, J.H. Wang and L. Yang | 18 |
| Experimental and Finite Element Study on Mechanical Behavior of Bolted Joint with Bolt Clearance in Transmission Tower B.R. Zhu, H.J. Xing and J.B. Yang | 25 |
| Mechanical Analysis on the Splicing Form of Cross-Section Multiple Angle Steel for Transmission Line Y. Gao, J.K. Han and Q.H. Li | 30 |
| Dynamic System of a Mechanical Press Driven by SRM for Flexible Process W.F. Shang | 37 |
| Numerical Simulation of Water Removal Process in the Microstructure of Gas Diffusion Layer with Mechanics Properties and Material Properties C. Sun, Q. Du, Y. Yin and B. Jia | 41 |
| Study on Optimization of Dynamic Characteristics of Turbo Generator Foundation Y.H. Sun and Q. Zhang | 45 |
| Three-Dimensional Simulation of Water Droplet Movement in PEM Fuel Cell Flow Channels with Fluid-Mechanics Properties and Different Deformations of GDL N. Bao, Q. Du and Y. Yin | 53 |
| Study on some Aspects of Breakup Characteristics of Power-Law Fluid with Impinging Jets Based on Mechanics Properties E.D. Wang, Y. Yin and Q. Du | 57 |
| Analysis of Dynamic Behavior of Ultra-High Voltage Porcelain Arresters with New Type Lead Dampers X.S. Zhang, Z.B. Dai, Z.C. Lu and C.C. Cui | 61 |
| Crashworthiness Analysis and Optimization of Thin-Walled Square Tube with Pyramidal Ripples Based on Mechanics Properties X.G. Hu and J.B. Yang | 69 |
| Dynamic Characteristics Simulation of the Digital Hydraulic Cylinder Based on AMESim X.S. Guo, Q.C. Li and J.L. Xiao | 75 |
| Study on Building Seismic Design Based on Mechanics Properties with Economical Assessment M. Zhong and W. Ji | 79 |
| Effects of the Launch Speed on Hydrodynamic Force of the Underwater Vehicle Vertical Launch with the Gas Curtain H.J. Liu, X.Z. Peng and Z.Z. Zou | 84 |
| Graphic Method for Design of Eccentric Slider-Crank Mechanism and Analyzing of Feasible Region C.Z. Hao, S.H. Ma, G.X. Cai, J.G. Yu and Z.N. Jia | 88 |
| Analysis and Optimization of Level-I Vibration Absorption of Single Drum Vibratory Roller X.B. Zhang, D.W. Zhang and Z.X. Feng | 93 |

| | |
|---|-----|
| Trajectory Planning and Prediction Guidance Based on the Moon-Earth Return Reentry Dynamics B. Zhao, N.G. Cui, J.F. Guo and P. Wang | 100 |
| Numerical Simulation of Sphere Impacting Water by SPH with Hydrodynamics Q.L. Qu, J.L. Wu, B.D. Guo and Y.P. Qin | 104 |
| Reentry Trajectory Planning Based on the Secondary Reversal Dynamics for the Second Generation Reusable Launch Vehicles B. Zhao, N.G. Cui, J.F. Guo and Y. Fu | 109 |
| Hydrocyclone Velocity Flow Simulation and Experimental Study Based on Fluid Mechanics H. Xu, X.H. Chen and Y. Yao | 113 |
| Hydrocyclone Two Phase Flow Experimental Research Based on Fluid Mechanics H. Xu and X.H. Chen | 117 |
| Vibration Reduction by Optimal Design of Powertrain Mounting System of Heavy Truck Based on SQP Method H. Jing, C. Li, F.Y. Liu and B. Kuang | 121 |
| Roller Element Bearing of Mine Ventilating Fan with Fault Diagnosis Based on Mechanics Properties and RBF Neural Network Y.H. Zhang, C. Li, H. Jing and B.B. Gao | 125 |
| Application Study of the Vehicle's Steering System with Mechanical Mechanics L.Q. Meng and Z.W. Wang | 130 |
| Research on the Initial Disturbance of Vehicular Missile with System Vibration Analysis C. Zhang and Y. Jiang | 134 |
| Launching Dynamics Simulation of Ship-Board Rocket Gun W. Zeng and Y. Jiang | 140 |
| Kinematic Analysis and Simulation of an A/C Axes Bi-Rotary Milling Head with Zero Transmission Y. Chen, M.F. Huang, B. Shi, M.M. Xiao, R.K. Hu and J.S. Tang | 146 |
| Dynamics and Trajectory Tracking of a Spherical Rolling Robot on an Inclined Plane T. Yu, H.X. Sun, Q.X. Jia, Y.H. Zhang and W. Zhao | 151 |
| The Motion Simulation and Analysis of Reinforced Flip Device Based on UG NX7.5 J. Sun, W. Zhu, H.L. Tang, L. Tian and W. Liu | 155 |
| Heat Design of Multi-Functional Structure of Electronic Equipment with Material Properties in Control System J.H. Wu, Q. Zhou, Q. Zhou, J. Chen, H.P. Si, K.Y. Lin and C.B. Zhang | 159 |
| The Finite Element Thermal Analysis for Lubricating Oil Transfer Pump in Different Convection Heat Transfer Coefficient with Special Material Properties J.N. Xu, W. Lv, W.J. Lv and D.Y. Zhu | 167 |

Chapter 2: Research on Material Engineering and Material Applications

| | |
|---|-----|
| Microstructure and Mechanical Properties Analysis of AL-5052 Self-Pierce Riveting Joint in Material Application Engineering J.N. Xu, X.C. He, Y. Tang, Y.F. Ding, Y.B. Hu and K. Zeng | 173 |
| Effect of Activated Carbon Materials' Surface Texture Parameters on Separation Factor for Coal Mine Methane X. Yang, Y.S. Liu and Y.L. Li | 177 |
| Preparation of Silver Doped PMN-PZT Ceramics and Their Energy and Materials Engineering Applications J.C. Kang and G.P. Zheng | 181 |
| Spectral Properties of the Optoelectronic Material Rhenium (I) Tricarbonyl Complexes with Bipyridine Ligand Containing Triphenylamine Moiety H.Y. Xia and F. Zhao | 185 |
| A Study on Preparation Methods of $\text{LiNi}_{0.5}\text{Mn}_{0.5}\text{O}_2$ Cathode Materials F.R. Lang | 189 |
| Optimization of Sanding Parameters for Wood Surface of Plantation-<i>Magnoliaceae glanca Blume</i> X.B. Li, J.D. Huang, C.W. Su, J.J. Luo and L. Lai | 193 |

| | |
|--|-----|
| Effects of Surfactant Agent and PTFE Content on Surface Morphology and Microstructure of Ni-P-PTFE Composite Coating C.Q. Fu, X. He and Z. Wang | 198 |
| The Status and Analysis of the Equipment for Fine Mineral Particle Classification in Coal Wash Plants J. Ma, S.H. Zou, X.Z. Wang, B. Hui, X.D. Liu, S.J. Chen, Y.N. Li and H.F. Chen | 202 |
| Specific Rebinding of Protein Imprinted Calcium Polyacrylate/Alginate Hybrid Materials via the Adjustment of pH Values W.K. Cui, K.Y. Zhao, J.F. Wei and G.X. Cheng | 206 |
| Concentrating Elastic Waves by Isotropic Homogeneous and Reflectionless Materials J. Hu and X.Y. Lu | 210 |
| Mechanical Properties, Morphology and IR Analysis of the Proban CC-Treated Celluloses S.F. Li, J.Y. Liu and B.W. Cheng | 214 |
| Effects of Different Carbon Sources on Performance of LiFePO₄/C Composite Material C. Yang, Y.M. Li, S. Liu and Y.C. Yao | 218 |
| Preparation and Magnetic Properties of Nanocrystalline (Fe,Cr)-N W.J. Feng, C.Y. Wang and H.H. Zhang | 222 |
| Numerical Simulation of Transient Response of Inlet Relative Humidity for High Temperature PEM Fuel Cells with Material Properties X.L. Chen, B. Jia, Y. Yin and Q. Du | 226 |
| Electronic Structure and Optical Properties of SiC Nanotube Material with Silicon Antisite Defect K.J. Li, J.X. Song and H.X. Liu | 230 |
| Analysis of Voltage Losses in High Temperature Proton Exchange Membrane Fuel Cells with Properties of Membrane Materials and Fluent Software X.L. Yang, Y. Yin, B. Jia and Q. Du | 235 |
| Surface Morphology Studies on PBI Membrane Materials of High Temperature for Proton Exchange Membrane Fuel Cells Z.Y. Zhai, Y.G. Shen, B. Jia and Y. Yin | 239 |
| The Carbon Deposition during Iron Ore Reduction in Carbon Monoxide S.H. Geng, W.Z. Ding, S.Q. Guo and X.G. Lu | 243 |
| Comprehensive Utilization of Oil Shale with Analysis of Material Properties Z.Y. Yuan | 247 |
| Ni Doped LiMn₂O₄ Prepared by a Flameless Combustion Synthesis G.Y. Liu, B.S. Wang, Y. He and J.M. Guo | 251 |
| Phase Structures of LiMn_{1.95}Fe_{0.05}O₄ Prepared by Solution Combustion Synthesis and Molten-Salt Combustion Synthesis Methods G.Y. Liu, B.S. Wang, Y. He and J.M. Guo | 255 |
| Sn-Ni Nano Particle Prepared by a Chemical Reduction Method G.Y. Liu, Z.L. Huang, Z.Z. Yi, L.D. Sun and H.Y. Sun | 259 |
| Influence of Carbon Doping on Microstructure and Tribological Properties of CrN Coating P.F. Hu, G.J. Yin and S.K. Zhou | 263 |
| Synthesis and Characterization of ZnS Nanoparticles by Using Polyvinylpyrrolidone as Stabilizer X.H. Fan, H.J. Liu, Y.M. Chen and T. Sun | 269 |
| Preparation of a Hydrophilic PVDF Membranes by Electron Beam Induced Grafting Polymerization of Acrylic Acid L. Yang, J.F. Wei, K.Y. Zhao and Z.A. Luo | 273 |
| Optical Energy Gap and Microhardness of Cu₃N Thin Films X.M. Yuan, T. Liu, X.H. Zhang and P.X. Yan | 277 |
| Thermal Design, Analysis and Verification of Chip-Level MCM with Properties of Semiconductor Materials J.H. Wu, Q. Zhou, Q. Zhou, J. Chen, H.P. Si, K.Y. Lin and C.B. Zhang | 280 |
| Fabrication of High-Quality CuInSe₂ Films by Coating, Compaction and Selenization J.G. Xu, Y.L. Wang and H.B. Nie | 287 |
| The Experimental Study of Diffraction Angle of Aluminum Alloy 3003 N.Q. Duan, J.L. Ren and R.Q. Pang | 291 |

| | |
|---|-----|
| Treatment Effect of Coking Wastewater Using Three-Phase Biological Fluid-Bed with New Ultrastructure Biological Carriers Based on Properties of Biological Materials N. Li, H.B. Liu and J.L. Huang | 297 |
| Characterization and Properties of CrTiN Films T. Liu, X.H. Zhang, X.M. Yuan, X.H. Zheng and G.A. Zhang | 301 |
| Microstructure and Mechanical Properties of Mo₂FeB₂ Based Cermets Containing SiC Whisker H.Z. Yu, W.J. Liu, L. Ying and M. You | 304 |
| Thermal Performance Analyses of Heat Pipe of All-Glass Evacuated Tubular Solar Collectors with Properties of Pipe Materials W.B. Chen and L.X. Zhang | 308 |
| Determination of Stress-Strain Constitutive Relation of Echelle Grating Al Film by Nanoindentation Test and Simulation G.F. Shi, G.Q. Shi, L.S. Song and Z.W. Xu | 312 |
| The Effects of Diffusion and Temperature-Dependent Properties on Generalized Thermoelastic Behaviors in Thermal Dynamics Y.P. Liu and S.H. Shi | 318 |
| Mechanical Performance of Ti/Cu-8Ag/S20C Clad Composite Processed by High Pressure Torsioning (HPT) J.Y. Song, J.S. Ha, I.K. Kim and S.I. Hong | 323 |
| Suitable Hydrogen Pressure Induced Anisotropy in HDDR-Treated Pr-Fe-B Powders G.B. Han, S. Fu, M. Liu and R.W. Gao | 328 |