

Table of Contents

Preface and Committess

Chapter 1: Advanced Materials, Technologies and Applications

Gangue as Flame Retardants for Flexible Poly(Vinyl Chloride) M. Gao, C.G. Song, D. Rong and Y.W. Ji	3
Novel Thermo Thickening Smart Gel with Interpenetrating Polymer and Surfactant Network J. Yang, Y.N. Zhou, Y.J. Lu, W.X. Cui, X.H. Qiu, B.S. Guan and Y.H. Ding	7
Smart and Robust Composite Tube Columns Frames for Offshore Sub-Structure Construction T.M.B. Albarody, Z.B. Mustaffa and M.S. Liew	11
The Research Process and Application Prospect of the Smart Piezoelectric Materials X.L. Fang, W.F. Zhang and H.X. Wang	16
Reusable and Efficient Polystyrene-Supported Acidic Ionic Liquid Catalyst for the Synthesis of n-Butyl Acetate Y.H. Cheng, B. Zhang, S.J. Dai, H.L. Tong and L.X. Li	20
An Exploration of Factors Affecting the Preparation of SiO₂-Coated α-Al₂O₃ Pearlescent Pigment N. Wu, Q. Chen, W.M. Zhou, M.Z. Ke, Q.R. Qian and Z.H. Yuan	26
Assessment of Engineering Properties of Geosynthetics with Seaming Methods H.Y. Jeon	30
Comparative Study of Physico-Chemical Properties of Pure Polyurethane and Polyurethane Based on Castor Oil A.M. Ali, K. Yusoh and S.F. Hasany	39
Temperature Effects and pH Value on Free Swell Behaviors of Bentonite Solutions H.Y. Jeon	44
The Thermal Properties of Unsaturated Polyester Resin Treated with Intumescence Flame Retardants M. Gao, D. Rong, C.G. Song and Y.W. Ji	52

Chapter 2: Nanomaterials and Nanotechnologies

Microstructure of Gold Nano-Crystals from Nanometer to Micrometer Lengthscale in Gold Bulk Metallic Glass N. Boonchu, A. Lawan, K. Thipayarat, S. Pintasiri, W. Kanjanakijkasem, S. Kuimalee and B. Lohwongwatana	59
Nanotechnology and Earth Construction: The Mechanical Properties of Adobe Brick Stabilized by Laponite Nanoparticles F. Scalisi	63
On Optimal Planning for DNA Nanomechanical Robots V. Popov	67
Preparation of Nano Ni₂P/TiO₂-Al₂O₃ Catalyst and Catalytic Activity for Hydrodesulfurization H. Song, Z.D. Wang, Z.S. Jin, F. Li, H.Y. Wang and H.L. Song	71
Study on the Nanoemulsion Formulation of Piceatannol and <i>In Vitro</i> Release Y. Zhang, Y.F. Yu, Z.H. Shang, M. Du and C.F. Wang	75
The Green Preparation of Nano-Silver Particle by Reductive Polysaccharide M.S. Yang, X.P. Wen and L.K. Li	79
Hybrid Microstructures on Si Surface Formed by Nanosecond Pulse Laser for Broadband Antireflection L.T. Yang	84
Computer Aided Simulation and Prototype Experiment on Nanocoated Products J.Z. Li	90

Influence of Injection Conditions on the Mechanical Property of MWCNTs/ PC Nanocomposites	94
L.J. Wang, J.H. Qiu and E. Sakai	
Nanomechanical Properties of Core-Shell Structured Ni@NiO Nanoparticles Reinforced Epoxy Nanocomposites	98
H.Y. Wang, L. Yan, Y.J. Zhu, H. Song and J.H. Zhu	

Chapter 3: Composites and Alloys

Effect of Injection Conditions on the Electrical Conductivity of MWCNTs/PC Conductive Composites	105
L.J. Wang, J.H. Qiu, E. Sakai and X.W. Wei	
Influence of Casting Method and Heat Treatment for Corrosion Resistance of Magnesium Alloy AZ91D	110
A. Dobkowska, B. Adamczyk-Cieślak, J. Zdunek, J. Mizera and K.J. Kurzydłowski	
Low Temperature Oxidation Behaviors of CNTs/MoSi₂ Composites	116
H. Zhang, H.J. Wu, J. Lin, S.Y. Gu and L. Yu	
Microsegregation Behavior of Single Crystal Superalloy	121
Z.H. Yu and J.F. Qiang	
Modeling the Correlation between Microstructure and Tensile Properties of Ti-17 Alloy Using Artificial Neural Network	127
Z.Q. Jia and W.D. Zeng	
One Step Fabrication of Core-Shell Structures in Immiscible Alloys for Thermal Energy Storage	131
F.M. Xu, M.B. Fu, W. Dong, L. Zhao, D. Lu and Y. Tan	
Surface Modification of Titanium Alloys Using Alumina Particles Blasting for Biomedical Applications	135
S. Udomlertpreecha, P. Pavasant and B. Lohwongwatana	
Technique Research on High Strength Low Alloy Structural Steel Used in Semi-Rigid Guardrail	141
H.X. Yu, Z.W. Zhou and H.S. Zhang	
The Effect of Co/Pd MgO Supported Catalyst Calcination Temperature on the Yield and Morphology of CNTs via Methane Decomposition	148
G. Allaedini, S.M. Tasirin, J. Sahari and M.Z. Meor Talib	
The Structure and Properties of NBR / Recycled Polytetrafluoroethylene (R-PTFE) Composites	152
W.W. Chen, C.L. Cao, Y. Zhang, L.R. Xiao, Q.R. Qian and Q.H. Chen	
Microstructure and Direct Measured Micro-Strain by TEM of Hot Iso-Static Pressed Alumina-Titanium Carbide (Al₂O₃-TiC) Composite	156
S. Thumsoontorn, S. Kuimalee, B. Kuntalue, S. Pintasiri and B. Lohwongwatana	
Characterization and Parametric Study of Multilayered IPMC Actuator	161
M.F. Shaari and Z. Samad	
A Novel Approach for Determining Critical Fracture Strain of a near Alpha Titanium Alloy during Hot Compression Deformation	166
W.W. Peng, W.D. Zeng, Q.J. Wang and Y.C. Zhu	
Thermal Behavior of Epoxy Resins Containing Manganese Compounds	171
F.C. Wu, S. Tian and S. Liu	
Thermal Degradation of Hemp Treated with Guanidine Dihydrogen Phosphate	175
Y.J. Sun, Y.L. Yang and M. Gao	
Improving Mechanical Properties of Poly-β-Hydroxybutyrate-co-β-Hydroxyvalerate by Blending with Natural Rubber and Epoxidized Natural Rubber	179
M. Chutamas, J. Sunthornvarabhas, J.K. Hyun and S. Klanarong	

Chapter 4: Manufacturing Processes, Materials Forming and Machining

Application of Calculus Equation in Solving Thermal Decomposition Kinetics Parameters of Flame Retardant Epoxy Resin	185
C.Y. Sun, Y.L. Yang and M. Gao	
Application of Calculus Equation in Solving Thermal Decomposition Kinetics Parameters of Flame Retardant Wood	190
C.Y. Sun, Y.L. Yang and M. Gao	
Dynamic Analysis of Stiffness Part for a Electromagnetic High Frequency Fatigue Testing Machine	194
Y. Zheng, Y. Zhang and X.W. Fan	
New Upgrade Solution to Highway Concrete Barrier	198
M. Li and H.X. Yu	
The Research of Demarcating the Laser Ranging Sensor by Least Squares Method	204
Y. Zheng, Y. Zhang and X.W. Fan	
A Fundamental Investigation on Ultrasonic Assisted Fixed Abrasive CMP (UF-CMP) of Silicon Wafer	208
Y.B. Wu and L.J. Wang	
Study on Slurry of SiC Crystal Substrate (0001) C Surface in CMP Based on Silica Sol (SiO₂ Abrasive)	214
Z.Q. Zhang, H.F. Cheng and J.X. Su	
Thermal Stability of Cotton Cellulose Modified with Calcium Complexes	218
Y.J. Sun, Y.L. Yang and M. Gao	
UV-Radiation Curing Process of Cationic Epoxy Adhesive Materials	222
W.L. Zhang, J.J. Chen, M.L. Tan, B. Li, L.Q. Ye, D.J. Fu, Q. Ma, X.W. Wang and D.S. Li	
ABAQUS Based on Machining Simulation during Metal Milling	226
Z. Dan and Z. Yan	

Chapter 5: Power Systems, Energy and Environmental Engineering

Design Study of Small Gas Cooled Fast Nuclear Power Plant for Synergetic Energy System with Renewable Energy by Employing Pump Storage	233
Z. Suud	
Electrochemical Performance of LiFePO₄/C Prepared from Different Carbon Source	238
A.F. Liu	
Flow Field Analysis and Response Surface Research on the Rotor in Dry Powder Inhaler	242
Z.C. Cao, H.Y. Li, S.H. Shi and E.L. Zhou	
Gas Permeation Properties and Characterization of Polymer Based Carbon Membrane	246
N. Sazali, W.N.W. Salleh, Z. Harun and A.F. Ismail	
Measurement Principle of Glass Thermal Expansion Coefficient and Technology Application of DIL402PC Dilatometer	251
Y.H. Sun, D.Q. Zhang, F. Wu and K. Sun	
Methodology of Taguchi Optimization for Organic Rice Bran to Maximum Antioxidant Activity	257
T.L. Su, S.W. Wang, H.H. Chien and C.J. Shen	
Resolving National Energy Crisis through Energy Efficient Appliances: Use of Ground Water Heat Pump for Air Conditioning Systems	261
A. Aizaz and N. Hafeez	
Solar Hydrogen Production Research Status and Prospect	265
D.Z. Wang, F.Z. Zhao and C.L. Zhu	
Stability of a Class of Power System with Interval Parameters	270
D. Xie, Z.H. Lu and W.J. Wang	
The Design and Implementation of Optimal Scheduling in Hydro-Thermal-Wind System	275
X.F. Tian	
The Effect of Air Cold Plasma Treatment on UHMWPE Fiber Surface Modification	280
X.X. Lin, X. Huang and Y.M. Wang	
The Effects of the Total Number of Regions and Average Power Density on the Overall Performance of Modified CANDLE Burn-Up Scheme Based Gas Cooled Fast Reactors	284
I. Rosidah, M. Afifah, Z. Suud, H. Sekimoto and A. Ferhat	

The Research of Marine Nuclear Power Two Loop Simulation Software Based on the Thermal System Analysis	288
G.L. Zhang, X.D. Jin, Z. Zhao and Z.J. Shi	
Transformer Impedance Determination for Power System Studies of Distribution Network integrated with Renewable Energy Resources	292
J.H. Tang, M.Z. Che Wanik, A.M. Busrah and A.K.M. Hussin	
Translational-Rotational Motion of Earth Artificial Satellite (EAS) in Hill's Gravity Field	300
K. Astemessova, A. Bekov, M. Shinibaev and D. Ussipbekova	
A Proposed Method of Photovoltaic Solar Array Configuration under Different Partial Shadow Conditions	307
A.M. Humada, M. Hojabri, M.B. Mohamed, M.H. Bin Sulaiman and T.H. Dakheel	
The Development of New Steel Backing Wood Landscape Guardrail	312
Z.W. Zhou, C.H. Wang and M. Li	
The Elimination of Pollution of Toxic Cadmium and Arsenic in Lead-Based Alloys of Lead-Acid Batteries in China	319
X. Liu, J.C. Cai and Y.H. Shu	
Thermal Stability and Smoke Suspension of Cotton Cellulose Modified with Magnesium Complexes	324
F.C. Wu, C.Y. Chao and S. Tian	
Phonon Interaction of Ultrasound Waves in Condensed Media	328
S. Omarov, T. Begimov, M. Tukibayeva, K. Maylina and G. Bedelbaeva	
Research on Internal Flow Field of Control Valve Outlet Blockage Fault	338
Y.T. An, R.J. Ma and D. Zhao	
Migration Study of Biodegradable Blends of Polylactic Acid and Epoxidized Natural Rubber	342
T. Nampitch	
Numerical Simulation of NO_x Emission in Supercharged Boiler	347
H.Y. Zhang, J. Zhao, L.B. Yang and Y.J. Li	
Conceptual Design Study of Small 400 MWt Pb-Bi Cooled Modified Candle Burn-Up Based Long Life Fast Reactors	353
Z. Suud and H. Sekimoto	

Chapter 6: Applied Mechanics and Engineering

Based on RFID Prefabricated Building Component Design and Monitoring System Research	359
J. Wang	
Design Optimization and Control Analysis of Mechanical Arm Equipped on Wheelchair	363
G.B. Luo, C.C. Zeng and L.D. Zhu	
In 16V265H Locomotive Diesel Engine Nozzle Flow Field Simulation Analysis	368
S.H. Li, M.H. Li and X. Du	
Mechanical Design to Adapt Changes to Existing Universal Test Bed Facility of Turbojet Engine for the Turbofan Engine	374
F. Ahmed, A. Aizaz and Z. Mahmood	
Simulation Analysis of Kinematics and Dynamics of 3-TPS Hybrid Robot	379
J.S. Shi, S. Wang, L.D. Zhu, W.S. Wang and T.B. Yu	
The Experiment Research on Storage Characteristic of PCM Storage Device by Spheres Piled Encapsulated for Vehicle Waste Heat	383
T.S. Zhang, Q.Y. Wang, G.H. Wang, C. Gao and Q. Gao	
The Phase Shift of Reflection and Refraction of SH-Wave at an Interface of Two Media	388
A.L. Wang and F.P. Liu	
The Research on Fault Diagnosis of Civil Aircraft Information Fusion Based on the Evidence Theory	392
X. Peng	
A Characteristic Seismic Study and Development of Earthquake Resistant Techniques in Existing Structures	396
M. Yasuhide and H. Yashwanth	

Shock Response Analysis of Marine Gearbox	400
W. Liu, T.J. Lin and Z.Y. He	
Design on the Detection System of Stud Welding Dynamic Parameters	404
B. Wang, X.X. Li and W.M. Zhang	
Influence of Lateral Shift on Normal Moveout of SH-Wave	408
A.L. Wang and F.P. Liu	
Mixed Interface Stress Element-Finite Element Model with its Application	412
Y.H. Sun, F. Wu, K. Sun and D.D. Li	
Modeling of Mass-Spring-Damper System by Complex Stiffness Method	420
S.G. Zhang and X.P. Dang	
Study on Control Quality of Valve Outlet Blockage Fault	424
Y.T. An, R.J. Ma and D. Zhao	
Development of Digital Filter Software in Auto Safety Components Test	428
C.J. Du, T.Q. Du and W. Liu	
A New Type of Adjusting Coaxiality Structure Design	436
B.R. Sun, Y. Zheng, Y. Zhang and X.W. Fan	
Design of a PLC-Based Engineering Training Unit	440
J.B. Han	
Flexible Thermosetting Pipe	444
Z.B. Mustaffa and T.M.B. Albarody	