

Table of Contents

Preface, Committee and Sponsors

Chapter 1: Research in Area of Applied Materials

The Formaldehyde Removal by Commercial Activated Carbons at Room Temperature L.L. Feng, X. Han, J.G. Li, P.Y. Zhang and Y. Ren	3
The Filtering Properties Research of Healthy Antibacterial Anti-Fog Silk Mask Fabrics Y.T. Liu, H.X. Zhang, J.F. Xu, Y.F. Jiang and C.Y. Zhu	7
Research on the Energy Conservation and Emission Reduction Technologies in First Washing Wastewater Y.H. Yu, G.H. Yue and Q. Wang	12
Research and Implementation of the Automatic Detection System of Aggregate Particles Characteristic Parameters Based on VC X.L. Hao, Z.Y. Sun, W. Li and Y.J. Hu	16
Microstructural Characterization of 3C-SiC Layers, Grown Epitaxially on 4H-SiC Substrates by CVD E.K. Polychroniadis, M. Sall and N. Chandran	22
Research on Metallographic Structures for Low-Alloy Steel after Fire Damage W. Chen, C. Jin and Y.P. Wang	27
Hybrid Plasmonics Waveguide Properties of Dielectric Nanowires Coupling with Metal Substrate Y.L. Zhang, Y.G. Wang and L. Yu	31
Influence of Liner Material on Formation of Multiple Explosively Formed Projectiles Warhead Parameters C.X. Zhao, F. Qian, H.Z. Zhang, C. Ji, Y. Lv and Q.M. Xie	37

Chapter 2: Films, Glasses and Surface of Materials, Technologies of Coatings

ArF Excimer Laser Assisted Solution Based Metal Induced Crystallization of Amorphous Silicon Films W.Y. Dai, J. Jin, C.X. Hui, C. Liu, Z.J. Yuan and W.M. Shi	45
Research of Mixed BTSPA and VTAS Silane Films Applied on the Steel Y.N. Feng, X.F. Zhu and T.Y. Li	50
Research of Structural and Optical Properties of MgZnO Films Annealed at Different Oxygen Partial Pressures W.W. Liu and Z.Z. Zhang	54
Annealing Time Influence on Optical Characteristic of Beta-FeSi₂ Thin Film X.C. Xiong, S.S. Kang, Q. Chen, J. Huang, Q. Xie and J.M. Zhang	62
Analysis of the Mechanical Behavior of Gravure Inks: Comparing Experiment and Numerical Methods S. Naskar, K.C. Paul and A.K. Pal	69
Influence of Annealing Temperature on the Properties of Zn-Sb Composite Thin Films by Magnetron Sputtering Y.H. Sun, J. Qin, G.H. Wang and W.M. Shi	76
Research on the Screening of Degrading Fungi for Poly (vinyl alcohol) Film and the Effect of Additives X.H. Hao, X.P. Yi and D. Li	80
Hydrophilicity and Self-Cleaning Property of Kroy-Processed Wool Fabric Coated with TiO₂/SiO₂ Composite Hydrosol Stabilized by BTCA Z.J. Xu, H.L. Liu, L. Zhang and X.M. Zhang	89
Homogenous Thin Films Prepared on Microchannel Plates via Atomic Layer Deposition B.J. Yan, S.L. Liu and L.P. Yang	93

Simulation and Analysis of Light Scattering by Air Bubble in Optical Glass S. Zhang, K.W. Wang, F. He and B. Zhou	98
Evaluation on Adhesion Strength of Laser Induction Hybrid Rapid Cladding Cu-Fe-Based Coatings Using Scanning Kelvin Probe X.Q. Dai, S.F. Zhou and Z. Xiong	103

Chapter 3: Metal Alloys and Steel

First-Principles Calculation of Al-Cu-Mg Alloy Strengthening Phase H. Ma, L.J. Chen, L.Q. Guo, L. Leng and L. Lin	109
Nickel Release Rate of Type 303 Free Cutting Austenitic Stainless Steel J.P. Yuan, D.D. Chen and H.R. Bo	114
3D Analysis and Nano-Indentation Mechanical Characterization of a Commercial Zr44-Ti11-Cu10-Ni10-Be25 Metal Glassy Alloy R. Aversa and A. Apicella	120
Erosion-Corrosion of Carbon Steel and Alloys in Ammonium Hydrosulfide Solutions H.Z. Jin, K.X. Wang, H.Y. Ren and G.F. Ou	125
Friction and Wear Behaviors of GCr15 Steel under Dry Friction and Grease Lubrication B. Su and S. Zhang	132
Corrosion Protection Behavior of γ-APS Films on Low Carbon Steel X.F. Zhu, T.Y. Li, H.Z. Shan, L. Niu and L. Liu	136

Chapter 4: Biomaterials and Chemical Materials

Synthesis, Crystal Structure and Optical Properties of Silver Complex with 2-Amino-4-Methylthiazole R.T. Xue, W.S. Sun and S.R. Yu	143
Synthesis and Characterization of Alkyl-Substituted Polyaniline by Using Ammonium Persulfate as both Oxidant and Dopant X. Li, M.X. Wan and C.J. Li	147
Preparation of Barium Aluminate with BaCO₃ and Al(OH)₃ J.Q. Li, R.K. Wang and C.Y. Chen	156
Cu-Ni Nanocatalysts in Mesoporous MCM-41 and TiO₂ to Produce Hydrogen for Fuel Cells via Steam Reforming Reactions R.Y. Abrokwhah, V.G. Deshmane, S.L. Owen and D. Kuila	161
Pathogen Identification and Fungicides Screening of Kushui Rose Leaf Spot Disease C.L. Wang and Q. Xu	169
Synthesis of ZSM-5 Zeolite without Organic Template Z.H. Yin, Y. Chen, Z.W. Wang, Y. Xing, X.J. Tian, Q. Yu and C.G. Meng	176
Research on Plasticizing Properties and Mechanism of PVA X.H. Hao and S. Wen	181
Adsorption Simulation of Basic Nitrogen Compounds in ZSM-5 and USY Zeolites by Grand Canonical Monte Carlo Method Y.B. Liu, Y.Z. Li and X. Ding	189
Structure and Characterization of Strong Acid Cationic Exchange Fiber M.Y. Li, D.Y. Yang, Q.X. Zeng, W.Q. Wang and Z.H. Li	194
Synthesis, Characterization, and Properties of POSS-Epoxy M.Q. Wen, T. Jiang and Y. Ding	199
Synthesis and Characterization of a New Fluorine-Containing Ultraviolet Light Absorber Based on BTA Z.Z. Chen, D.Y. Xiao, M.Y. Shao, J.J. Sun and B. Xiang	204
The Utilization of Phenol Components in Bio-Oil for Modifying Urea-Formaldehyde Resin Adhesive Y. Cheng, Q.K. Tian and R. Li	209
The Properties of Polyetheretherketone Biocomposite Reinforced by Surface-Modified Nano-Hydroxyapatite L. Wang, L.Q. Weng, Z.Z. Wu and C.B. Wang	214

Improved Stabilities of Lipase by Immobilization on Eupergit C B. Wang, C.Y. Zhang, X.Y. Hu, D. Ma, L. Su and Q.F. Zhou	219
A Review of PGLA Model of Medical Materials in Clinical Catgut Embedding Application Y.N. He	224
The Structure and Stability of C₂₀ Dimer T.T. Dai, P.Y. Huo, J.C. Yu, H. Liu, Y.X. Song and X.R. Zhang	228
Heat Transfer Model of Larch Bark Particles Pyrolysis Y.W. Sun, Y. Cheng, L. He and R. Li	232
The Research on Adsorption of MB by SPES Microspheres and SPES Microspheres Wrapping Titanium Dioxide K.H. Wu and F. Huang	237
Study of Errors on Larch Wood Pyrolysis Kinetic Analysis L.S. Xu, Y. Cheng, Y.Y. Li and R. Li	243

Chapter 5: Materials Science and Processing Technologies, Mechanics of Materials

Effect of MgO and Ag₂O Mix-Additions on the Formation and Superconducting Properties of Bi-2223 Phase X.Y. Lu, D. Yi and H. Chen	251
Mechanism of the Indium by Carbothermic Reduction Reaction from Indium Ore in Vacuum Y.C. Liu, Y.C. Du, X.H. Zhu, Y.H. Xiao, H.Y. Zhao and X.L. Cheng	256
In Depth Analysis on the Excitation Spectrum of SrS: Eu²⁺, Dy³⁺ X.X. Duan, S.H. Huang, L.X. Yi and W.C. Wei	262
Numerical Analysis of Semi-Solid Die-Casting Automobile Part Based on the Thermo-Visco-Plastic Constitutive Relation J.J. Wang, G.M. Lu and J.G. Yu	268
Research on the Dark Fiber Causes and Variety of the Acidic Fiber Imaging Bundle D.C. Zhou, Z.L. Qiao and X.M. Bai	275
A Modified Monte-Carlo Potts Model for Dynamic Recrystallization J. Fu, B.Y. Peng, B. Xie and Y.G. Ye	280
Analysis and Explanation of Agglomeration Phenomenon Based on Raman Spectrum H.L. Li, G.X. Sun, S.Q. Jiang and S. Bin	288
Application of Ant Colony Algorithm in Optimal Preform Design of Forging Process X.H. Zhao, J.C. Bai and G.Q. Zhao	292
SPH Analysis for Transient Thermal Stress of FGMs with Temperature-Dependent Properties G.M. Rong and H. Kisu	297
Experimental Study on Aging Characteristics of Liquid Silicone Rubber Sheds for Composite Bushing M.Z. Zhu, Y. Liu, C.G. Li and J.J. Liu	302
The Influence of Doping Both NiO and CoO on the Properties of Low-Loss and High Bs MnZn Ferrites S.Q. Yang, P.F. Yu, T.H. Liang, Q.X. Yang and Y.F. Meng	309
A Novel Modified Paris' Law Based Evaluation of Fatigue Crack Propagation of LD2 under Combination of Corrosion and Cyclic Loadings X.D. Li, H. Lv and W.X. Wang	315
Effect of Heat Treatment on Microstructures and Mechanical Properties of A356 Alloy by Low Pressure Casting X.J. Yu, Y.L. Lu, F.X. Zhu and X.C. Li	319
Supercapacitive Performance of Mesoporous Carbon Materials Co-Templated by F127 and PDMS-PEO Y.R. Liu	325
π-Lithium Noncovalent Interaction between π-Bond-Containing Compounds and NH₂Li: A way of Construction for Supramolecular Materials K. Yuan and L.L. Lv	331

Synthesis and Preparation of Eu(BA)₃Phen and its Fluorescent Falsification-Resistant Screen Printing Ink	
J. Meng	336
Effect of Cutting Speed during Turning of Low Carbon Steel on Mechanical Properties and Surface Roughness	
Z. Boumerzoug, F. Remli and F. Delaunois	340
Forming Compound Parts of Metal / Plastics by Rolling-Extrusion	
L.B. Ji and Q.X. Xia	346
Quantitative Calculation of Polynuclear Aluminum Content in the Forced Hydrolysis-Polymerization Course of Aluminum (III) Salt Solutions	
J. Yang, C.Y. Wang, L.H. Teng and K.L. Zhang	351
A Method for Preparing Sample Used in Evaluating Adhesion Performance of Hot Melt Adhesives in Textiles	
G.F. Huang, Z.L. Li, W.Y. Zhu and Z.X. Zeng	356
Colossal Permittivity Observed in Yttrium Doped BaTiO₃	
Z.J. Shen and L.N. Bing	360
The Application of Moldflow in Injection Molding of the Helmet	
Y.C. Huang, H.B. Liu and H.T. Wu	366
Spontaneous Deposition of Bonelike Apatite Layer on Bioactively H₂O₂-Treated Titanium Substrate	
W.J. He, R.F. Zhu and Y.P. Lü	371
Analysis and Optimization on Injection Molding Process of Double Helical Gear Based on Moldflow	
C.Y. Jiang and H.L. Shen	376
Effect of Accurate Dimension Part during Transfer Die Technology	
S. Kumjing	381
Influence of Slag on Water Resistance of Magnesia Phosphate Cement	
Z. Wang, Y.K. Ding and S.R. Li	387
Organic Light Emitting Properties of the Functional Pyridine-Containing Diacylhydrazones	
K. Yuan, L.L. Lv, X.F. Wang and Y.C. Zhu	392
Pervaporation Separation of Cyclopentadiene/Methylcyclopentadiene Mixtures from Cracking C5 Fractions Using Polyimide Membranes	
J.Q. Chen, H.L. Lv, Y.Q. Yao and B. Chen	397
The Treatment of Waste Metal Cutting Fluid by Extraction and Adsorption Process	
H.Z. Shan, T.Y. Li, Y.Z. Li and S.H. Chen	402
Computational Study of the Decomposition of Cyclotetramethylenetetranitramine under Impact, Friction, and Electric Fields	
H. Hu, M.M. Li and B.S. Wang	407
The Changes of Thickness and Tearing Behavior of Tencel Fabrics Treated with Different Time by Plasma	
L.S. Zhang, H.L. Liu, W. Yu and R.H. Liu	413
The Numerical Simulation of Effective Elastic Response for WC-Co Cemented Carbide	
P.L. Li and Z.Q. Huang	417
The Effect of KMnO₄ Concentration on the Catalytic Activity of MnO_x/Luffa Sponge Composites	
X. Han, L.L. Feng, J.G. Li, P.Y. Zhang and H. Li	422

Chapter 6: Polymers and Reinforced Composites

Flame Retardation of Banana Fiber Reinforced Epoxy Composites Using Melamine Pyrophosphate and Pentaerythritol as Intumescent Flame Retardants	
J.Y. Pang, X.Z. Mo, Y.X. Liu and Y.F. Zhu	429
Fabrication and Characterization of Aramid/Aerogel Composite	
L.R. Yao, J. Ren and S.Q. Xu	435
Preparation and Structure of Amino-Modified Multi-Walled Carbon Nanotubes	
Y.H. Li and J.F. Sun	441
Performance and Morphology of PVDF/PEG-POSS Hybrid Membrane	
F. Hu and J.F. Sun	446

Study on the Mechanical Properties of Cement-Based Composites Were Reinforced through the Jute Fibers at Different Content	
H. Qiu, T.T. Huang, Y. Zhang, T.T. Yan and P. Peng	450
Preparation, Damping and Thermal Properties of Castor Oil-Based Polyurethane/Poly(Methyl Methacrylate-Butyl Methacrylate-Styrene) Grafted Interpenetrating Polymer Networks	
Z. Fang and Q.Z. Dong	455
Isothermal Crystallization Behavior of PLA/PIL Composites	
P. Zhou, M. Zhou, J.Y. Hu and X. Qian	465
Preparation and Separation Properties of Oleyl Alcohol-Modified PDMS Membranes	
Y.P. Liao, H. Ye and Y. Wang	470

Chapter 7: Nanomaterials, Microelectronic Materials and New Functional Materials

Synthesis of N749 Dimer and its Application in Dye-Sensitized Solar Cells	
X. Liu, L. Jiang, L. Sun, C.F. Du, W.Q. Deng and N.Y. Huang	477
A New SERS Substrate Based on TiO₂ Nanorods Thin Film Assembled Gold Nanoparticles	
X.F. Yu, X.L. Cheng and P.Y. Lv	481
Synthesis and Luminescence Property of Sr₃Al₂O₆:Eu³⁺ Red Phosphor Prepared by Co-Precipitation Technique	
H.M. Gao, F.Y. Yan and L. He	486
Electrochromic Properties of Fluorescent Dye Doped Poly(3,4-ethylenedioxythiophene) with Different Polymerization Times	
X. Li, F.Y. Liang and C.J. Li	492
A Novel PNIN Barrier Controlled Tunnel FET	
H. Wang, S. Chang, Q.J. Huang and J. He	497
The New Study Based on a Dual Ion Implantation PSD Structure	
Q. Li, T.Z. Li and X.P. Chen	503
Mesoporous Ce_xZr_{1-x}O₂ Mixed Oxides Supported Cr-V-O Nanocatalysts for Dehydrogenation of Propane to Propene	
B. Agula and S.Q. Dalai	509
A 600V-Class Partial SOI LDMOS with Step-Doped Drift Region	
Y. Hu, H. Wang, D.W. Wang, C.X. Du, M.M. Ma, J. Yang and J. He	514
Molecular Dynamic Study on Thermal Conductivity of Methyl-Chemisorption Carbon Nanotubes	
Y.P. Song, Y. He and Y.Z. Tang	520
Reduction Kinetics of Nano-Sized Nickel Ferrite for the Production of Metallic Alloys	
K.S. Abdel Halim, M. Ramadan, N. Messaoudene, M. Aichouni and A.A. Al-Ghonamy	524

Chapter 8: Construction and Building Materials

Application of Phase Change Materials in Buildings	
T.L. Fan and F.Q. Zhao	533
Experimental Study of Factors on the Conductive Properties of Carbon Fiber Reinforced Concrete	
J. Ma, C.H. Gao, H.Q. Zheng and D.B. Wang	538
Study on Mix Proportion of C80 High-Strength Tri-Admixture Concrete	
H.C. Wang, C. Chen, G. Liu, J. Shi and C.H. Zhao	543
Time-Dependent Finite Element Analysis of Prestressed Concrete Beams	
T. Liu	548
Effect of Loading Rate on the Properties of Asphalt Concrete Using Three-Point Bending Test	
I. Md Rashadul, A. Mohiuddin and A.T. Rafiqul	553
Stochastic Filtering Back Analysis of Elastic Modulus of Box Shaped Beam	
B. Yu, T. Hong and J. Zhang	557

Analysis of Fatigue Mechanical Behaviors of Welding Conformations in Orthotropic Steel Bridge Deck	
B. Yu, T. Hong, J. Zhang and Q.Y. Liang	562
Dynamic Behavior of T Thin-Wall Steel Member Subjected to Lateral Explosive Loading	
J.Y. Wu, Y. Long, C. Ji, F.Y. Gao and H.B. Zhao	567
Effect of Random Inclusion of Palm Fibers on Strength Characteristics of Shanghai Cohesive Soil	
J.L. Qu, D.X. Zhao and B.B. Li	572