# Materials Science and Engineering II

Selected, peer reviewed papers from the 2nd International Conference on Materials Science and Engineering (ICMSE2013)

**Advanced Materials Research Volume 668** 

### Jiujiang, China 8-10 March 2013

**Editors:** 

David M. Batisdas Y. Q. Chang

ISBN: 978-1-62748-722-1 ISSN: 1022-6680 Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2013) by Trans Tech Publications Ltd. All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact Trans Tech Publications Ltd. at the address below.

Trans Tech Publications Ltd. Laubisrutisr 24 CH-8712 Stafa-Zuerich Switzerland

Fax: +41 (44) 922 10 33 Fax: +1 (603) 632-5611 e-mail: sales@ttp.net

#### Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400 Fax: 845-758-2634 Email: curran@proceedings.com Web: www.proceedings.com

### **Table of Contents**

#### **Preface and Sponsors**

### **Chapter 1: Composite Materials and Technologies**

<b>Preparation and Tribological Behavior of Self-Lubrication Composites Ni-W-Cr-Fe-Cu-MoS</b> <sub>2</sub> -Graphite at Elevated Temperature J.R. Sun, C.S. Li, H. Tang, Z.C. Guo and J.Y.Z. Liu	3
Preparation and Performance Evaluation of Chitosan Local Medicine Composite Membrane Material	
L. Guo, Z.Y. Zhao, X. Zhao, J. Bai and S.Y. Han	9
<b>Preparation and Photocatalytic Activity of TiO</b> <sub>2</sub> / <b>Opal Composite</b> Q.S. Li, B. Zhan, W. Hong and G.Z. Xing	13
The Preparation and Dielectric Properties of BT/PANI/PVDF Composite X.J. Yang, J.Y. Li and Y.P. Lei	17
Effects of Compounding Addition of Sintering Aids on DC Bias Superposition Characteristic of NiCuZn Ferrites L. Dong, Z.K. Feng and S.Q. Yan	21
Antibacterial Activity of TiO <sub>2</sub> /AgY Composite Materials J. Yang and X.W. Xu	25
Photocatalytic Activity of $Ag_2S/K_2Ti_4O_9$ for Rhodamine B Degradation under Visible Light Illumination	
W.Q. Cui, S.L. Lin, S.S. Ma, L. Liu and Y.H. Liang	29
Phase Structures and Mechanical Properties of SGF/PP Composites with and without Compatilizers	33
<b>Cell Structure Refining Mechanism of Pure Aluminum Foam with Fine Cell Structure</b> X.X. Luo, X.Q. Zuo and Y.S. Wang	37
Thermal Storage and Release Properties of Aluminum Foam - Paraffin Composite Phase Change Materials	
X.X. Luo, X.Q. Zuo and M.W. Zhao	42
Pavement Performance of Low Dosage Cement Stabilized Gravel Powder Mixed with Aggregates C.Y. Zhuang and Y.L. Ye	48
Flame Retardant Properties of Two Different Synthetic Process of Ammonium Polyphosphates	
G.S. Liu and Y.L. Liu	53
Water-Soluble Substance: Characteristics and Effects on the Properties of Natural Rubber Latex L.F. Fan, S.O. Liao, C.O. Li, X.X. Liao and M.W. Guo	57
A Preliminary Research on Alkali-Activated Slag Concrete as Tunnel Lining in Severe	57
Frigid Regions H. Shu	65
PZT / MWNTs / EP Piezoelectric Damping Composites Conductivity and Dynamic Mechanical Analysis	70
C.G. Zang and A.F. Cao Effect of Surface Modified Feemed Fe Powder on Tribological Properties of Semi Metallic	/0
Friction Material Y. Cao, Y.K. Zhou, J.Y. Wei, T.Y. Yang and H.W. Nie	75
Nano-HA Preparation and its Effects on Mechanical Properties of nHA/PLLA/PES	
<b>Composite Biomaterials</b> Z.C. Zhou, X.J. Shen, X. Fan, Q.M. Wu, H.L. Yang and J.M. Ruan	80
Compatibility and Crystallinity of Electrospun Aligned PHBV/PEG Ultrafine Fibers	20
Scaffolds M.L. Shao, Q. Yang and L. Chen	85

The Bioactivity of Gradient Composite Bioceramic Coating with La <sub>2</sub> O <sub>3</sub> Fabricated by Wide Band Laser Cladding	01
Study on New Industrial Briquette Composite Binder Using Response Surface Methodology W Zhao, Y.C. Li and X.L. Tong	91
Study on Stress Measurement of the MSG Magnetic Measurement Stress Sensor Based on Composite Properties of Materials	101
Photocatalytic Degradation of Indigo Carmine by ZnO-Cu <sub>2</sub> O/Graphene Oxide Composites Synthesized via Hydrothermal Method H.D. Wu, J.S. Chen and J.C. Hu	101
Computational Study on Triphenylamine-Based Dyes Containing Benzimidazole Units for Dye-Sensitized Solar Cells Z O Wan L L Zhou C Y Jia X L Yao and Y Shi	110
The Process Research on VN-Making which Deploy Vanadium Pentoxide Powder, Graphite and Carbon Black in the Lab A.G. Ning, H.N. Ding, J.J. Ma and H.J. Guo	115
Chapter 2: Chemical Materials and Technologies	
Soot Formation in Propane/Air Diffusion Flames X. Sun, D.W. Zhang and G.L. Ning	123
Preparation of Melamine Molecularly Imprinted Polymeric Microspheres by Two-Step Seed Swelling Polymerization N. O. J. Chen, Y.P. Zhang, Y.L. Zhang and L.Y. Bai	128
<b>The Saponification Extraction Process and Result Analysis of Rare Earth Organic Phase</b> Y. Mei and Z.R. Nie	120
<b>Degradation of Indoor Ammonia Using TiO</b> <sub>2</sub> Thin Film Doped with Iron(III) under Visible Light Illumination S.I. Wang, H. Yu and X.O. Gao	136
The Study on the Treatment of Nitrobenzene Wastewater by Heterogenious Catalysts and Electrode Oxidation	140
Synthesis of Copper Complexes of Poly [2-(dimethylamino ethyl methacrylate)-B-Poly (oligo (ethylene glycol) monomethylether methacrylate-B-Poly [2-(dimethylamino ethyl methacrylate)	140
Q.Q. You and P.Y. Zhang Preparation of Cryolite from Industrial Grade Sodium Fluorosilicate	145
R.R. Liu and Y.R. Qiu An Enzyme-Catalytic Chemiluminescence Method for Detection of Ethanol Using HAuCl <sub>4</sub> -	149
H <sub>2</sub> O <sub>2</sub> -Luminol System L.S. Wang, P.F. Wang, S.S. Huang and Z.L. Jiang	153
Biodiesel Production through Direct Transesterification of Microalgae with Alcohol via Ultrasonic Wave Y.F. Kang, H.J. Shi, L.G. Yang, J.X. Kang and Z.O. Zhao	157
<b>Investigation of Potentiostatic Electrodeposition of Ir in LiCl-KCl Molten Salt</b> J.G. Qian, P.R. Li, H.T. Li and T. Zhao	162
Emission Characteristics of Particulate Number in an On-Board Test of a Diesel Passenger Car Fueled with Biodiesel D.M. Lou, Z.C. Kan, Z.Y. Hu, P.O. Tan and O. Feng	167
Investigation of the Solubility and Absorption Rate of CO <sub>2</sub> in DEA Promoted K <sub>2</sub> CO <sub>3</sub> Aqueous Solution	
D. Fu, X.C. Wu and H.M. Hao Effects of Different Sodic Deflocculants on Rheological Properties of Acid-Resistant	174
<b>Overglaze Slip</b> C. Li, Q.C. Liu, A.M. Chen, J. Feng and T. Feng Physical burger of Slam Palaces A. (i) (i) (ii) (iii) (	178
Inclusion Complex X.H. Hao and P. Jiang	183

<b>Flotation Test Research on Refractory Copper Oxide Ore by Using Combined Activators</b> P.R. Wang, H.X. Dai, L.K. Gao and G.Y. Xu	188
Effect of Black Carbon in Soil and Sediment on Organic Chemical Sorption and Carbon Sequestration J. Zhang	194
<b>Replica Exchange Molecular Dynamics Simulations of Coarse-Grained</b> <b>Polymethylmethacrylate Chains</b> B. Du, Z.L. Wang and X.H. He	199
Selection of Dehydration Temperature to Prepare Ammonium Polyphosphate with Crystalline Form V by Phosphoric Acid Process G.S. Liu and Y.L. Liu	203
<b>Pereparation of Hollow Silica Core/Mesoporous Silica Shell Monodisperse Uniform Spheres</b> L.L. Lv, W.H. Geng, C. Wang, Z.Y. Xie, Y.J. Zhao, Y. Guan, X.D. Bai and L.G. Sun	207
<b>Study on Treatment of Ammonia Nitrogen Waste Water by Zeolite-Granule-Adsorbent</b> J.J. Tian, J.F. Guan, C.J. Yan, W.C. Wang, L.Q. Hu and G. Cao	211

### **Chapter 3: Polymer Materials and Technologies**

A Fast Responsive Thermosensivtive P(NIPAM/AA-Na) Hydrogel and its Fire Suppressing Experiment	
C.L. Jia, Q. Wang and K. Tang	219
<b>Research on Performance of Epoxy Electronic Packaging Materials</b> H.R. Zhou, A. Sun, H.C. Yang and S. Zhao	226
<b>Preparation and Capacitive Properties of Polyaniline/Au Film</b> Q.J. Shan, H.R. Zhang, J.X. Wang, Z. Wang and S.C. Wang	231
Kinetics and Substrates Optimization on a Facultative and Methanotrophic Bacterium T.T. Zhao, L.J. Zhang, Y.R. Zhang and X.Y. Peng	236
Removal of Chromium from Aqueous Solution by Polymer Enhanced Ultrafiltration Using Copolymer of Maleic Acid and Acrylic Acid L.J. Mao, Y.Q. Wang and Y.R. Qiu	241
<b>Synthesis of RAFT Molecularly Imprinting Polymer Based on Ionic Liquid</b> F.X. Qiao and M.G. Wang	246
<b>Synthesis and Properties of Novel Polymer Electronic-Phosphorescent Materials</b> Q.Q. Wang and Q. Xu	250
<b>Temperature Dependent Photoluminescence from Polysilsesquioxane Xerogels</b> Z.M. Xu and Y.X. Wang	255
Preparation of Two Novel Ionic Electroconductive Polyurethanes Functionalized with the Backbone of Ionic Liquid	
D.J. Zhang, C.Y. Qu and Y.X. Chen	259

### **Chapter 4: Material Removal and Processing Technologies, Recycling Applications**

Surface Modification of Coronary Stents for Intravascular Gene Delivery L.X. Liu, X.H. Li, C. Zhang, X.G. Leng and C.X. Song	265
<b>The Theoretical Research on Development Direction of Cement Grinding Aids</b> J.F. Wang, D.M. Wang, D.L. Li, G.B. Tang and C. Du	269
Preparation and Characterization of Metronidazole Liposome by Supercritical Reverse Phase Evaporation Method S.H. Chen, X.W. Liu, S.P. Zhan, C. Yu and J. Zhang	274
<b>Improvement of Porous Medium Permeability by Injecting Overheated Steam</b> T.Y. Zhou	279
<b>Dissolution Behavior of Cast WC Particles in NiCrBSi-WC Coatings by Laser Induction</b> <b>Hybrid Cladding</b> S.F. Zhou and X.Q. Dai	283

The Removal of In <sub>2</sub> O <sub>3</sub> SnO <sub>4</sub> Thin Film Using an Arc-Form Tool for the Precision Recycling	
P.S. Pa	288
<b>Pavement Performance of Hot In-Place Recycling for Waste Asphalt Mixtures</b> Y.L. Ye, C.Y. Zhuang and J.B. Hu	292
<b>Review of Status and Development of Research of Lead-Free Solder</b> X. Zhang, B.L. He and Y. Song	297
Molten Salt Synthesis of Chlorapatite Whiskers P. Zhao, T.R. Zhao, X.H. Ren, S. Zhao and K. Yang	302
<b>The Performance of Recycled Asphalt Materials II</b> J. Liang	305
<b>The Performance of Recycled Asphalt Materials I</b> J. Liang	309
Simultaneous Photocatalytic Removal of Cr(IV) Ions and Methylene Blue Using InVO <sub>4</sub> /TiO <sub>2</sub> Nanocomposites under the Sunlight Irradiation Z. Zhao	313
<b>The Removal of Manganese from Underground Water by the Immobilized Manganese-Oxidizing Bacteria</b> C.L. Zhang, J.J. Wang, Q. Mei and H. Yang	317
<b>Double-Electrode GMAW Welding Process Research Based on the DSC</b> G.H. Ma, J. Nie, C.Y. Zhang and J. Ye	321
Chapter 5: Nanomaterials and Nanotechnologies	
The Dynamical Property and Abrasion Performance of Polyester Polyurethane/SiO <sub>2</sub> Nanocomposite	
H. Shi and Y.H. Li	327
<b>Preparation and Characterization of NiO Nanowires via Single-Phase Precipitation</b> F.L. Zhu and Y.S. Meng	331
<b>Synthesis and Aqueous Dispersion of Monodisperse Magnetic Fe</b> <sub>3</sub> O <sub>4</sub> Nanoparticles W.J. Zhang and F. Wang	335
Structure and Properties Evolution of Nanostructed AgBr/TiO <sub>2</sub> Visible Light Photocatalyst in Cyclic Running L.W. Qin, K.F. He and W.P. Chen	338
Analysis on Crack Propagation Mechanism of Nanosingle Crystal Copper about Holes Influence	
G. Li, M. Chen and Z.M. Liu	343
Fabrication of Nano Porous PVDF Beads	

	0.0
Fabrication of Nano Porous PVDF Beads D.B. Luo, Y. Tao, B. Xiang, Y.F. Wang and H.X. Liu	347
<b>Investigation of Micromechanical Deformation Mechanisms in Sinter Powder Metals</b> J.M. Chen, H. Yuan and M. Schneider	351
Nanotubes Could Be a Useful Tool for Protein Folding Study W.G. Duan, H. Yin and X.M. Lv	356
Preparation of Aerogel-Modified Expanded Perlite and its Application in Heat Insulation Coating	
K. Peng and H.M. Yang An Aptamer-Nanogold Probe for Trace PDGF Using Resonance Rayleigh Scattering as	360
<b>Detection Technique</b> J.Q. Long, L. Wei, A.H. Liang and Z.L. Jiang	365
A Dithiothreitol-Modified Nanogold Resonance Rayleigh Scattering Spectral Probe for Detection of Trace Cr(VI)	
J.Q. Long, L.L. Xu, B. Chen, A.H. Liang and Z.L. Jiang	370
J.Q. Long, H.M. Qin and A.H. Liang	375
Preparation of Ag-TiO <sub>2</sub> @MnO <sub>2</sub> and Degradation of Toxic Organic Pollutants under Visible Light Irradiation	
Y.F. Fang, J.Z. Liu, S.L. Wang, A.P. Deng and Y.P. Huang	379

<b>Preparation and Study of Spherical Nickel Hydroxide Coated by Cobalt Oxy-Hydroxide</b> X.G. Hou, W.W. Liu, C.X. Li and Y.F. Wang	383
<b>Preparation of Antibacterial WPU Nanometer Titanium Dioxide Composite</b> S. Zhou, B. Zhou, C.Y. Huang and J.J. Chen	388
<b>Resonance Rayleigh Scattering Effect of Te Particles and its Analytical Application</b> L.S. Wang, A.H. Liang and Z.L. Jiang	393
Chapter 6: Control and Guided Systems	
<b>Design of Fuzzy Controllers in AC Servo System</b> J.H. Zhou, Y. Du and Z. Weng	401
<b>Modeling and Control for GMA Based on Hammerstein Model Structure</b> Q.S. Liu, Z. Zhang and J.Q. Mao	406
Research of the Workpiece-Stage Control System Based on the ACR9000 in the Composite Coating Equipment of MEVVAII and FAD	
R.X. Zhang, B. Liao, Z.G. Liu and X.Y. Wu The CO-Simulation Research of Vehicle Active Suspension Based on Fuzzy Control	410
Z.G. Huang, J.G. Ding, K. Liu and X.D. Bao	415
Simulation Analysis of Proportional Valve Controlled Cylinder Hydraulic System Based on AMESim	
N. Xie, X. Chen and J.J. Guo	420
<b>Study on Intelligent Control of Laser 3D Rapid Prototyping Based on PMAC</b> J. Li, S.H. Shi, G.Y. Fu, F. Cao and Y.S. Zhang	426
Chapter 7: Advanced Technologies in Manufacturing, Mechanical Engineering and Industry, Design, Modeling, Analysis and Simulation	
<b>Simulation of Isolation Performance of Hydraulic Suspension System</b> F.Y. Yi, R.C. Guo and M.Z. Xie	433
<b>Evaluation of Deformation Characters in Edgesof Hot Rolled Slab by Lode Parameter</b> H.X. Bian, L. Zhu and G.Q. Hou	437
Entertainment Commercial Space of Lighting Design L.X. Sun	442

E.A. bui
<b>An Optimum Design of Piling Machine Column with FEM</b> W.P. Liu, Y.M. Han and J. Jin
<b>Research on the Manufacture of Multi-Sipe Radial Tire Molds by EDM</b> M.T. Feng and Z.G. Li
<b>Shearing Edging Investigation in High-Speed Blanking Process Applying Precision</b> <b>Progressive Die</b> Z.Y. Huang and F. Ruan
The Study of the Simulation of Low Rigidity, Variable Cross-Section Shaft Electrolytic Grinding X.J. Zhang, L. Yong and X. Feng
<b>Stiffness Analysis of a Novel Hybrid Manipulator for Mould Repairing Based on ANSYS</b> Z.S. Li, Y.G. Li and E.J. Zhang
<b>Analysis of the Fracture for Transmission Output Shaft Based on ANSYS Workbench</b> Z.S. Liu, L.L. Han and X.Q. Gao
<b>Study on Naval Vessel Repair Risk Evaluation Model Based on Fuzzy Cognitive Map</b> Y. Lu, L. Fang and G. Jun

Y. Lu, L. Fang and G. Jun480Analysis of Specific Load Capacity of Radial Hybrid Magnetic Bearing<br/>C.E. Wang and J.C. Fang485A Comprehensive Fuzzy Method in Seismic Disaster Prediction of Urban Rail Transit<br/>Girder Bridges<br/>Y.J. Ni, J.X. Yan and H. Jiang490FEM Analysis of Stress on Shaft-Sleeve Interference Fits<br/>J. Shen, D. Chen, G.F. Liu, D. Zhou and X.D. Du495

Analysis on Insulation Resistance Performance in Airport Lighting Circuit H.F. Dong, Q.J. Gao and J.S. Liu	500
<b>High Frequency Impedance Model of Electric Vehicle Traction Battery</b> Z.Y. An, Q.D. Wang and Y.M. Yang	506
<b>Electromagnetic Performance Analysis of Claw-Pole Alternator with Changing Permeance</b> X.H. Bao and M.Z. Liu	510
<b>Study on the Automobile Exhaust Thermoelectric Generator Test Bench</b> R. Quan, X.F. Tang and S.H. Quan	514
Chapter 8: Dynamics and Mechanics of Physical Prosesses and Behavior in Manufacturing and Materials	
The Mechanism for the Production of Coherent Structures near Wall of a Turbulent Boundary Layer Excited by Wall Local Impulse Disturbance W.G. Wu, C.G. Lu and S.F. Xue	521
The Thermo-Mechanical Coupling Analysis of Disc Brakes Transient Temperature Field Z.L. Zhang, Z.P. Wang and R.Q. Dai	525
Nano Mechanical Behaviors of Hindleg Cuticle in Beetle <i>Dorcus titanus</i> (Coleoptera: Lucanidae)	
Z.X. Yang, Z.H. Liu, C. Guo and Z.D. Dai Numerical Simulation of Laser Soldering about Electronic Connectors Y. Liu, X.B. Li, Z. Zeng and T. Liu	529 534
Influence of Preheated Wire on GMAW Process J. Ni and H.M. Gao	538
Structure Evolving at Bonding Interface of Dual-Alloys Jointed with Different Method under Coupling Action of Heat and Force Z.K. Yao, C. Oin, Y.O. Ning, J.X. Chao, J.W. Zhang, Z.G. Tan and Z.L. Zhao	543
Preparation of Several Ionic Liquids with Excellent Friction-Reducing and Antiwear Properties	547
<b>Thermal Stratification Effects on Surge Line Fatigue Life Based on Finite Element Analysis</b> T. Liu, S.B. Yi and X.C. Wang	551
Coupled Heat Transfer Analysis of Interlayer Active Cooling Barrel of Large Caliber Gun Based on CFX	
S.J. Peng, X.H. Wang and C.G. Yu <b>Research of Explosive Welding: Numerical Simulation and Analysis</b> X X. Wang, I X. Wang and Y. He	555 560
A Study of Strain Distribution and Cell Adhesion of MicroHA/CS Composite Scaffold under Mechanical Loading	000
J.M. Zhang, R.X. Li, T.T. Ren, C.H. Shi, H. Li, Z.M. Wan, Y. Guo, H.Y. Wang and X.Z. Zhang Comparison of Conductivity of Al <sub>2</sub> O <sub>3</sub> Nanofluids between Experiments and Maxwell Model	565
J.Z. Yu, B. Liu and Z.L. Li Mechanical Characteristic Study of the Roller Forks' Main Girder Using Different	571
Materials X.M. Feng, X.B. Duan, X.C. Lu and Y.L. Li	575
The Thermal Stress Analysis of Langmuir Probe and its Heat Dissipation System Based on the Finite Element Method L Fang and Y.S. Xie	580
A Novel Interior Ballistic Prediction of Gun Propellants Based on Experimental Pressure- Apparent Burning Rate Model in Closed Vessel	500
Calculation Analysis of Natural Frequency of Pipe Conveying Fluid Resting on Pasternak Foundation	384
B. Chen, M.L. Deng and Z.J. Yin The Multiaxial Creep Strength Analysis Coupling with Damage Evolution for 3D	589
Innercasing of the USC Turbine System J.F. Mao, J.H. Zhang and W.Z. Wang	593

Static Coupling Analysis of a Six-Axis Force Sensor Based on Double Layer E-Type Membrane	
Z.H. Wang, D.Z. Xu and W. Zhang	598
<b>Investigation on Heat Transfer Performance and Mechanism of New Condensation</b> <b>Enhanced Tubes with Machined Surface</b> J.S. Wang and Y.Z. Li	603
<b>An Investigation of the Unstable Oscillation Phenomenas of Two-Phase Closed</b> <b>Thermosyphon</b> F.Z. Tian, G.M. Xin, X.Y. Wang and L. Cheng	608
The Comparative Modal Analysis of Simulation and Experiment on the Electronic Button- Sewing Machine Shell L. Zhang, G.Y. Nie, H. Wu and J. Chen	612
<b>On Determining Elastic Modulus from Instrumented Indentation</b> S. Huang and H. Yuan	616
Analysis on Crack Types and Causes of Junshan Bridge's Steel Box Girder Orthotropic Plate J.H. Cheng, J.M. Xiong and J. Dai	621
<b>The Effect of Specimen Orientation and Thickness on the Initiation of Delamination Crack</b> <b>in X80 Pipeline Steel</b> X.Y. Liu, T.Y. Hu and Z. Yang	625
Microstructure-Mechanical Properties Correlations in Composite Grid Structures X.M. Lu and Y.F. Ma	630
<b>Research on Constitutive Model for Cartridge Case Materials</b> H. Zuo, J.L. Sha, R.G. Han and Y.H. Liu	635
<b>Experimental Research on Stress-Strain Curve of Carbon Fiber Reinforced Concrete</b> X.C. Wang, J.W. Wang and H.T. Liu	640
Experimental Study on the Viscoelastic Properties of Asphalt Concrete under Chloride Corrosion J.Z. Zhou, J. Dai and J.H. Zheng	645
Steel Truss Girder Bridge Reinforcement Removing Phase Analysis of Stress Dynamic Monitoring	
Y. Zhou, J.F. Shi and T.Q. Yu	650

## Chapter 9: Materials Optical, Magnetic and Electrical Properties and Technologies, Films and Devices Applications

Experimental Study of Nd:YVO <sub>4</sub> /KTP Solid Laser Pumped by Diode Laser	
S.X. Pei, F.P. Cui and S.D. Sun	659
<b>InAsSb Single Crystals and Photoconductors with Cutoff Wavelengths Longer than 8 μm</b> Y.Z. Gao, X.Y. Gong, T. Makino, H. Kan, G.H. Wu, Y.B. Feng, T. Koyama and Y. Hayakawa	664
Sintering of Ultrahigh Density and Highly Conductive ZnO-Ga <sub>2</sub> O <sub>3</sub> Ceramic Targets C.Q. Liu, Z.J. Zhang, L. Gao, C. Xiao and H.T. Yang	670
<b>The Study of the Influence of Surface Geometric Error on Optical Properties</b> T.R. Liu, X. Qiu, Y.H. Xu, Y.L. Li, Y. Hu and Q. Zou	675
<i>p</i> -Type Field Effect Transistor and UV-Photoconductive Characteristics of Na Doped	
Y. Xue, H.P. He and Z.Z. Ye	681
Sintering of Ti-Doped Tungsten Trioxide Ceramic Targets Z.J. Zhang, C.Q. Liu, L. Gao, C. Xiao and H.T. Yang	686
Synthesis of Highly Luminescent Glutathione-Capped CdTe-Mn/ZnS Quantum Dots Y.F. Liu, W.F. He, G.Q. Wang, S.M. Fang and Y.A. Sun	691
Synthesis and Solution Self-Assembly Behavior of Porphyrin Tethered by Fullerene $C_{60}$ W.L. Sitienei, L.M. Wangatia, T. Zeng, B. Sun and M.F. Zhu	696
Synthesis of Pyrrolidine Substituted Perylene Imide End Capped with POSS Nanoparticle and a Preliminary Study of its Electronic Properties	
L.M. Wangatia, T. Zeng, B. Sun and M.F. Zhu	701
Microstructure and Magnetic Properties of La-Doped Barium-Ferrite	
C.S. Zhang and L. Yang	706

First Principle Study of the Optical Properties of Transition Metal Nitrides XN (X=Ti, Zr,	
J. Wang, F. Li, J. Ao, Y. Zhong and Z.Q. Chen	710
The Simulation of Soft Magnetic Materials' Shielding Characteristic in the near Field	
Y. Zeng, S.Q. Yan, Q.F. Li, Z.K. Feng, J. Wu, H.W. Li and L. Peng	715
<b>The DC-Bias-Superposition Characteristics of Low Sinter Temperature NiCuZn Ferrite</b> S.Q. Yan, Q.F. Li, L. Dong and Z.K. Feng	719
Electron Paramagnetic Resonance Study and Magnetic Property of Ni-Doped Titanate Nanorods	
X.W. Wang, X.T. Shi, S.P. Lv, J. Chen and S.Y. Wang	723
Research of Micropore Electric Spark Machining Based on Hymu 80 Soft Magnetic Alloy Material L Ma X D. Xiong and L. Cheng	720
Micromagnetic Simulation on the Microwave Magnetic Properties of Glass-Coated	12)
Amorphous Alloy Microwires	722
Flectromagnetic Noise Suppression Characteristics of FeCoBM-Al <sub>2</sub> O <sub>2</sub> Amorphous Soft	/33
Magnetic Films	
X. Xiong, Z.K. Feng, X. Wang and L.G. Li Influence of Microwaya Calcination on Microstructure and Magnetic Properties of Sr	/3/
Hexagonal Ferrite	
Z.Y. Chen, Y. Zhou, F. Chen and Z.K. Feng	741
Influence of SI-Ca Oxide on Microstructure and Magnetic Properties of Calcined Sr <sub>1</sub> . $_xLa_xFe_{2n-x}Co_xO_\alpha$	
Y. Zhou, Z.Y. Chen, F. Chen and Z.K. Feng	745
Study on Preparation and the Noise Suppression Effect of Co <sub>2</sub> Z Ferrite Films Q.F. Li, S.Q. Yan, Y. Zeng, Z.K. Feng, J. Wu, H.W. Li and L. Peng	749
Micro-Structure and Magnetic Properties of Hexagonal M-Type Ferrite Thick Films Prepared by Tape Casting F. Chen, Z.Y. Chen, Y. Zhou and Z.K. Feng	753
Effect of Growth Atmosphere on the Structural, Optical and Magnetic Properties of Fe-	
<b>Doped In<sub>2</sub>O<sub>3</sub> Films</b> P.F. Xing, S.H. Sun and P. Wu	757
<b>Room Temperature Magnetoelectric Coupling in Bi</b> <sub>5</sub> <b>Ti</b> <sub>3</sub> <b>FeO</b> <sub>15</sub> <b>Ceramics</b> X.Q. Chen, X.B. Zeng, F.J. Yang, X.P. Kong, C. Wei and P. Su	762
Single Wafer Atomic Layer Deposition Reactor Design T. Zhou, H.W. Jiang, Y. Xiao, Y.B. Yao, B. Shan and R. Chen	767
Low RCS Antenna Based on EBG Structure	771
Effect of Duty Cycle on Microstructure and Corrosion Resistance of MAO Coatings Fabricated on AZ91D Magnesium Alloy in an Optimized Dual Electrolyte	//1
S.Y. Wang, Y.P. Xia, L. Liu and Q. Chen	779
Investigation of the Microstructure Evolution of 6016 Aluminum Alloy during Homogenization	
L.Z. Yan, Y.G. Zhang, X.W. Li, Z.H. Li, F. Wang, H.W. Liu and B.Q. Xiong	784
A Significant Improvement in Mechanical Properties of near Eutectic Nb-Si Alloys Y.J. Jiang	789
<b>Research and Verification on Damping Performance of Magnesium Alloy</b> Y. Ni, Y.L. Huang and W. Tan	794
Structure and Properties of Mo Wear Resistant Coating Prepared on TC4 through Glow Plasma Deposition X.D. Tian, L.J. Wang and B. Sun	799
A New Method of Directional Solidification of Cu-Cr Alloy L. Li, L.S. Li and C.J. Qiu	804
Study on Corrosion Behavior of Ti-Ni-Nb Shape Memory Alloy and 1Cr18Ni9Ti Stainless Steel Aeroplane Pipe System LX_Shi and LH_Liu	808
5.7X. OIII 0110 5.11. LIU	000

Proportional Cyclic Loading	014
R.F. Wang, Y.I. L1 and H.P. An The Study of the Microstructure and Mechanical Properties of Friction Stir Spot Welding	814
Joint between AZ31B Magnesium Alloy and Steel	Q1Q
A.J. Wang, T.L. Wu, Z.K. Zhang, T.K. Guo, T.A. Lu and J.F. Shi Effects of Hot Extrusion and Aging on Microstructure and Mechanical Properties of Mg-	010
Zn-Si-Ca Magnesium Alloy	000
X.Q. Zhang, G. Chen, Y. Wang and M.Y. Han Sol-Gel Derived TiO <sub>2</sub> Coating on Hydrothermally Roughened NiTi Alloy	823
B.H. Dong, C. Zhang, Z. Alajmi, K.Y. Wang and T. Fu	830
<b>Review of Status about the Effect of Ultrasonic Impact on Fatigue Properties of Welded</b> <b>Joints of Magnesium Alloy</b> Y.X. Yu, B.L. He, B. Wang and S.Y. Zhou	835
Transformation Behavior of Austenite Continuous Cooling of Nb-V Micro-Alloyed Low	
Carbon Steel J.C. Bao, J.X. Ma, J. Zhao and B.Q. Ning	840
Effect of Process Parameters on Temperature Field during Laser Sintering of 316L Stainless Steel Powder	0.4.4
N.F. Ken, D. Wang, L. Jia and X.B. Ge The Effect of Calcium Treatment on the Corrosion Resistance of Manganese Steels	844
S. Chen, X.Q. Chen, L. Zheng, G.M. Li, W.S. Chang and G.L. Cao	850
<b>Experimental Study on Heat Transfer Boundary Conditions for Steel Hot Extrusion Process</b> C.Y. Liu, L. Zhang and F.Y. Kang	856
Dynamic Strain Aging in the Fe-Mn-Cu-C TWIP Steels	861
The Formation Mechanism of Equiaxed Crystals in Pure Aluminum Solidification Structure under the Al-Ti-C Master Alloy WW Ding WI Zhao and TD Xia	865
Segregation Patterns and the Phase-Field 3D-Model for Adiabatic Phase Transition in Al-	005
Cu Alloys H.M. Ding, T.Q. Zhang and L.C. Pu	870
Effects of Electrolyte Parameters on Properties of Ceramic Coatings Formed on Aluminum Alloy 7075 by Plasma Electrolytic Oxidation	875
Effects of Surface Oxide Coating on Corrosion Behavior of Ti-1023/LY12 Galvanic Couple	075
J.X. Shi and J.H. Liu	880
<b>Investigation of Microstructure and Properties of an Al-Zn-Mg-Cu Alloy</b> X.W. Li, B.Q. Xiong, Y.G. Zhang, Z.H. Li, F. Wang and H.W. Liu	885
Influence of Welding Sequence on Residual Stress and Distortion in Rectangular Welding of 6061 Aluminum Alloy Y Jie L Can and Z G Sun	890
Orthogonal Experimental Study on the Grinding-Hardened Layer's Depth and its Uniformity of 45 Steel	
W. Yuan, J.D. Liu and Z.L. Xu	898
Mechanism Analysis and Dairy Filtration Experimental Research on Porous 1Cr18Ni9 Stainless Steel Components X.P. Dong, Y.T. Huang and M.J. Huang	902
Quench Sensitivity and Quench-Induced Precipitation in High Strength 7xxx Series	
Aluminum Alloys Z.H. Li, B.Q. Xiong, Y.G. Zhang, X.W. Li, F. Wang and H.W. Liu	907

### Chapter 11: Biomaterials, Natural Materials and Technologies

The Determination of the Heat Release Rate on Cotton Smoldering Fire and Polyurethane Fire H.W. Li, Y.T. Yue, Y.X. Li and H. Zhang

915

Dynamic Mechanical Properties of Trimethylborate (TMB) Modified Poplar Wood by Sol-	
C. Wang, W.B. Zhang and Y. Cheng	920
<b>Characterization of Chemolithoautotrophic Growth</b> <i>Herbaspirillum</i> sp. Isolated from <b>Volcanic Environment in Miyake-Jima Island, Japan</b> H.S. Lu and L.Q. Shi	924
<b>The BP Neural Network Model of Soil Water-Salt Dynamic State Analysis</b> Y.G. Qiang, M.S. Zhang and Z.B. Li	928
A Study of the Best Extraction Technology of Nasal Mucosa Dosing Bromo Gels L.C. Mao, S. Zhang, Y.B. Li and J.J. Chen	933
<b>Preparing Technology of Porous Hydroxyapatite/Chitosan Bioceramics</b> F. Wang, L.W. Sun, J.X. Shen and P. Zhao	937

## Chapter 12: Automation, Optimization, Algorithmes in Manufacturing and Industry, Applications

Multi-Objective Pareto Optimization of Double-Station Milling Process with the Use of PSO	
X.K. Lin, Q.Q. Wu and J. Xu	943
Forecasting and Discussing of the Fouling Characteristic of the Plain Tube X.Q. Wen, Z.M. Xu, J.G. Wang and L.F. Sun	949
<b>Prediction of the Slagging Characteristics of Coal Ash Based on Vague Sets</b> X.Q. Wen and L.F. Sun	954
<b>Study on the Application of FBG Technology in Rainfall Monitoring</b> D.J. Tan, B. Han, L.L. Li and J.P. Liu	959