

Table of Contents

Preface and Organizing Committee

A. Environment Related Materials and Photocatalysts

Effect of Solution Treatment on Microstructure and Properties of the SAF2507 Super Duplex Stainless Steel

J.M. Liu, J. Liu, G.W. Fan, D.F. Du, G.P. Li and C.J. Chai 3

Materials Life Cycle Assessment of Chemical Strengthening Glass Used for Touch Screen Panel

N.R. Lee, S.S. Lee, K.I. Kim, S.J. Hong and T.W. Hong 7

MLCA (Material Life Cycle Assessment) for ITO Recycling

S.S. Lee, N.R. Lee, K.I. Kim, S.J. Hong and T.W. Hong 12

Study of Resistance Characteristics of Silicon Carbide Resistor Materials

H.Y. Jin, D.W. Feng, Z. Huang, R.D. Niu, R.Z. Liu, B. He and L. Shao 17

Synthesis of Sn⁴⁺ Doped TiO₂ Nanotube and its Photocatalytic Activity

H.Y. Dong, Y.P. Ren, K.M. Huang, W.Y. He and W. Ma 21

Removal of Isopropyl Alcohol (IPA) Using Anodized Photocatalytic Metal Membrane Reactor

J.O. Kim, W.Y. Choi and Y.W. Lee 25

Treatment Performance of Low Strength Electric Wastewater Using Solid-Advanced Oxidation Processes

J.O. Kim, J.S. Lee and J.W. Chung 29

Photocatalytic Degradation of Humic Acid Using Ti/Anodized TiO₂ Metal Plate with Fe-Doping

J.O. Kim, S.P. Choi, G.T. Kim and Y.H. Kim 33

Fabrication of Nanosheet-Assembled Hierarchical AlOOH and γ-Al₂O₃ Microspheres and its Application in Water Purification

X.M. He, G.J. Li, H. Liu and J.Q. Li 37

Low Temperature Molten-Salt Synthesis and Characterization of Nanocrystalline Mullite Whiskers from Coal Gangue

X.L. Wu, D. Zhao, J.F. Zhu and Q. Ren 41

Effect of Temperature and Carbon Contents on the Synthesis of β-SiC from Silicon Sludge by Direct Carbonization Method

W.T. Kwon, S.R. Kim, Y. Kim, Y.J. Lee, J.Y. Won, W.K. Park and S.C. Oh 45

A Study on the Synthesis of SiC Powder from the Silicon Sludge of the Photovoltaic Industry

W.T. Kwon, S.R. Kim, Y. Kim, Y.J. Lee, E.J. Jung, W.K. Park and S.C. Oh 49

A Study on the Improvement of Nitrogen Removal Efficiency in Small Size Sewage Treatment Facility Utilizing Zeolite Carrier

H.J. Joo, J.S. Choi, K.H. Lee and S.C. Kim 53

The Rheological Properties of Konjac Glucomannan (KGM) Solution

P. He, X.G. Luo, X.Y. Lin and H.P. Zhang 57

Preparation and Application of Electrospinning Membranes of Thermoplastic Carboxymethyl Cellulose/PLA for Removal of Cu²⁺ from Aqueous Solutions

Y. Li, X.Y. Lin, Z. Chen, X.G. Luo and W.L. Zuo 61

Extraction of Polyethylene Residue Components in Soil

C. Chen, X.G. Luo, X.L. Xiong and X.Y. Lin 65

Research of Low Cost Fracturing Proppant

L.X. Liu, R.D. Niu, H.Y. Jin, B.Q. Lv and S. Liu 69

Studies on Adsorption of Strontium (II) by Expanded Rice Husk

Y.Q. Tang, X.Y. Lin, Y.P. Zhang and X.G. Luo 73

Preparation of Porous Poly(butylene succinate)(PBS)/Starch Blends for Absorption of Copper (II) Ions

H. Zhou, X.G. Luo, X.Y. Lin, J.W. Li and H.P. Zhang 77

The Study of Environmental Degradation Characteristics of Photodegradable Polyethylene Film	81
Q.B. Shi, X.G. Luo, X.Y. Lin and H.P. Zhang	
Effect of PE Film Degradation Products on the Carbon Dioxide Content of Soil: A Mathematical Study	85
J.L. Wu, X.G. Luo, H.P. Zhang and X.Y. Lin	
Effect of Gelatinization on Morphology and Thermal Properties of Polyvinyl Alcohol-Corn Starch Blend Films	89
J.W. Li, X.G. Luo, X.Y. Lin and X.H. Li	
Factors Affecting Coagulation of Phosphorus from Municipal Sewage	93
J.O. Kim and J.H. Moon	
Adsorption of Bromic Acid Ion in Water by the Reduced Titanium Oxide	97
E. Watanabe, K. Nishizawa and M. Tazawa	

B. Eco-Materials Processing and Design, Multifunctional Materials

Properties of Artificial Lightweight Aggregate by Using Magnetic Separated Bottom Ash from Coal Power Plant	103
Y.T. Kim, C.S. Jang and Y.J. Choi	
Bio-Inspired Synthesis of Al₂O₃/Polymer Composite	107
K.M. Nam, Y.J. Lee, S.R. Kim, W.T. Kwon, H.S. Kim and Y. Kim	
Thermoelectric Properties of Manganese Monosilicide Synthesized by Mechanical Alloying Process	111
M.K. Choi, W.J. Lee, I.H. Kim, Y.G. Lee, S.Y. Kweon, M.S. Yoon and S.C. Ur	
First-Principles Investigation on Ag, N Codoped in p-Type ZnO	115
C. He, W.X. Zhang, L. Duan, Q.W. Li and Z.Q. Shi	
Characteristics of Artificial Lightweight Aggregate by Using Magnetic Separated Desulfurized Fly Ash and Dredged Soil	119
Y.T. Kim, C.S. Jang, K.G. Lee and J.S. Lee	
Cu₂O Doping Effects on Microstructure and Piezoelectric Properties in (Na_{0.52}K_{0.44})(Nb_{0.9}Sb_{0.06})O₃-0.04LiTaO₃ Pb-Free Ceramics	123
S.Y. Kweon, Y.K. Lee and S.L. Ryu	
Effect of N₂ Addition on Microstructure and Properties of SAF 2507 Duplex Stainless Steels GTAW Welded Joint	127
D.F. Du, J. Liu, G.P. Li and J.M. Liu	
Study on the Manufacturing of Zirconia Cutting Square Tools by PIM and Hot Isostatic Pressing Process and Test Cutting	131
Y.M. Heo, S.H. Chang and K.H. Shin	
Compressive Strength Evaluation of SCR Catalyst Recycled Al-Dross	135
M.A. Bae, H.D. Kim, K.H. Kim and M.S. Lee	
A Study on the Effect of High Calorie Diet on Stress Alleviation	139
S.G. Roh and J.G. Lee	
Fabrication and Surface Hardening Properties for SiC/AlN Ceramic Composites with Different SiC Grain Size	143
H.Y. Jin, Z. Huang, B. He, N.K. Gao, L. Shao and G.J. Qiao	
Reduction Effects of Urban Heat Island by Water-Retentive Pavement	147
R.H. Kim, J.B. Park, J.S. Mun and J.H. Lee	
Prediction of Fine Blanking Tool Deformation to Produce Multiple Turbocharger Vane Levers with Stainless Steel	151
J.D. Kim and J.J. Kang	
Defects Diagnosis Technology of Water Supply Pipe's Network Using Pipe Endoscope Camera of High Resolution/High Pressure Resistance Performance	155
H.D. Lee, P.J. Kwak, J.Y. Lee, C.H. Park, J.Y. Ko and M.H. Cho	
Preparation and Characterization of KGM/CaCO₃ Composite Films	159
Y. Chen, H.P. Zhang, X.Y. Lin, M.Q. Chen and Y.M. Jiang	
Effect of Aluminum Addition on the Static Recrystallization Behavior of Magnesium	163
K.J. Kim and T.K. Ha	

A Study on Thermal Conductivity and Mechanical Properties of Al-Zn-Mg Aluminum Alloys

J.S. Shin, S.H. Ko and K.T. Kim 169

A Study on Surface Oxidation Coating Characteristic of Al-Si Casting Alloys

J.S. Shin, B.H. Kim and S.M. Lee 173

Hot Workability of a High Strength Low Alloy Steel for Construction Application

W.Y. Jung and T.K. Ha 178

Effect of Deep Cryogenic Treatment on Microstructure of 5A06 Aluminum Alloy MIG Welded Joint

S. Gao, Z.S. Wu, P.F. Jin, J.J. Wang and P. Shuai 182

Microstructure and Mechanical Properties of Al/Cu Composite Produced by Hydrostatic Extrusion during Isothermal Aging

H.G. Jeong and J.B. Lee 186

Effect of Annealing Process on Mechanical Properties and Texture Changes of AZ31 Mg Alloy Sheets

H.J. Bang, H.G. Jeong and J.B. Lee 190

C. Nano-Structured and/or Hybrid Materials, Porous Materials

Porosity Measurement of Porous Copper by Unidirectional Solidification

H. Du, Y.X. Lao, J.Z. Qi and T.Y. Xiong 197

Effects of β - Si_3N_4 Seeds Addition on Microstructure and Mechanical Properties of Porous Si_3N_4 Ceramics

F.L. Yu, Y. Bai, J. Du, P.P. Yu, J.Z. Wang and J.F. Yang 201

Synthesis of ZnO Nanorods with Tunable Aspect Ratio

L.Y. Zhang, F. Wang and J.F. Zhu 205

Effect of Size and Stress Field on Electronic Properties of ZnO Nanowires

C. He and W.X. Zhang 209

Hydrogen Permeability of NiO-Doped Alumina with Nickel Composites Membrane

B.Y. Shon and M.W. Jung 213

Preparation of Porous Alumina Powder Using Sol Containing Trehalose Dihydrate

T. Miki and Y. Tai 217

Research on Production of Bluecoke with Low Temperature Carbonization Process

L. Wu, J. Zhou, X.Z. Lan, X.C. Zhao, Y.H. Song and J.S. Hua 221

Synthesis and Characterization of Sn Doped SiO_2 by Reverse Micelle and Sol-Gel Process

K.J. Jeong and D.S. Bae 225

Development of Dynamically-Formed Membranes Using Colloidal Silica and Kaolin

T.G. Yun, Y.J. Kim, S.H. Lee, J.S. Sohn and J.S. Choi 229

Preparation of Lanthanum Oxide Nanoparticles by Chemical Precipitation Method

Q.L. Zhang, Z.J. Ji, J. Zhou, X.C. Zhao and X.Z. Lan 233

Preparation and Characterization of Polyethylene/Ethylene Vinyl Acetate Composite Non-Dropping Greenhouse Film

J.C. Wei, X.G. Luo, X.Y. Lin and H.P. Zhang 237

Study on Microstructure and Mechanical Properties of Porous Si_3N_4 Ceramics

F.L. Yu, Y. Bai, J. Du, P.P. Yu, J.Z. Wang and J.F. Yang 241

Characterization of Cold-Rolled Nickel Electroplated Copper Sheet

J.I. Lee and C.W. Hong 245

Fabrication and Characterization of Alumina/Zirconia Ceramic Compound

B.R. Cho, J.H. Chae, B.L. Kim and J.B. Kang 249

Research of Assembled Monolithic Compound Spiral Reinforced Concrete Column Encased by Steel Plate Hoop and Jointed by Bolts

J. Li, X.J. Li, Q.N. Li, W.S. Jiang and Y.H. Ying 255

D. High Performance Materials

Low-Temperature and Rapid Fabrication of Bulk Nano- TiO_2 Ceramic

G.W. Liu, W.Z. Jian, H.Y. Jin, Z.Q. Shi and G.J. Qiao 261

Study on Preparation of Nano-SiC Fibers by Template Method Based on Waste Cotton Linter	265
T. Xue, J.G. Meng, Y. Song and S. Zhao	
Shot Peening Characteristics of Cold-Rolled Mo Sheet	269
G.S. Cho, K.H. Choe and W.B. Lee	
Preparation and Mechanism of Nano-TiO₂ Coatings on Poly(<i>p</i>-phenylene-benzobisoxazole) (PBO) Fiber	274
Y.Y. Luan, X.F. Liu, Z.N. Peng and J.X. Xie	
Effect of TiC Content on the Microstructure and Mechanical Properties of Ti₃AlC₂/Al₂O₃ <i>In Situ</i> Composites Synthesized by Hot Pressing	278
L. Ye and J.F. Zhu	
Effects of Sintering Conditions and Additives on Translucent Silicon Nitride Ceramics	282
W.W. Yang, M. Inada, Y. Tanaka, N. Enomoto and J. Hojo	
The Dynamic Recrystallization of Hot-Deformed Austenite in a Micro-Alloyed Steel	287
Y. She, Z.H. Zhang, J. Yang and J.T. Ju	
Effect of Electromagnetic Stirring on the Microstructure and Mechanical Properties of the High Speed Steel	291
C.R. Zhang, X.D. Song, J. Yang and J. Dong	
Preparation and Performance of LiFePO₄/C Using Fe₂O₃ as Starting Material	295
Q. Ren, Y. Yang and X.L. Wu	
Molten Salt Synthesis of Mullite Whiskers from Silicon Carbide Precursor	299
W. Wang, G.W. Liu, G.J. Qiao, J.F. Yang, H.W. Li and Y.J. Guo	
Effect of Sintering Agents on the Sintering and Physical Properties of ATO (Antimony Doped Tin Oxide)	303
J.Y. Ryu, Y. Kim, Y.J. Lee, Y.S. Lim, W.S. Seo, W.T. Kwon, H.J. Choi and S.R. Kim	
A Brief Review about Surface Treatment of Magnesium Alloys	307
Y. Bai, F.L. Yu, J. Du, W.X. Wang, Z.Q. Cui, Z.H. Han and J.F. Yang	
Effects of Impregnating and Heat Treatment on the Oxidation and Thermal Shock Properties of Pressureless Sintered SiC/Graphite Composites	311
W.L. Yang, Z.Q. Shi, Z.H. Jin and G.J. Qiao	
Synthesis of Layered-Ternary Ti₂AlC/Al₂O₃ Composites by an <i>In Situ</i> Reaction and Hot Pressing Sintering	315
J.F. Zhu and R.J. Pan	
Microstructure Evolution during Combustion Synthesis of Ni/Ni-Aluminide Laminated Composites	319
Y.J. Guo, Z.Q. Shi, H.W. Li, G.W. Liu and G.J. Qiao	
Effect of Sintering Temperature on the Microstructure and Electrical Properties of SnO₂-Based Varistors	323
G.L. Hu and J.F. Zhu	
Effect of Calcination of the Raw Materials on the Microstructure and Electrical Properties of ZnO-Based Linear Resistance Ceramics	327
J.F. Zhu and Y. Zhou	
Drawing and Property of 316L Extra Fine Stainless Steel Wires	331
S.F. Liu, P. Xu and B.J. Wang	
Effect of Ti, Al and Cu Addition on Structural Evolution and Phase Constitution of FeCoNi System Equimolar Alloys	335
X. Wang, H. Xie, L. Jia and Z.L. Lu	
Effect of Impact Angle on Erosion Wear Behaviours of SiC_p/Cast Iron Surface Composite	339
Z.L. Lu, H. Jin, Y.X. Zhou and H. Xie	
A Study on Reaction Bonded Ceramics Fabricated by Silicon Infiltration to B₄C Preforms	343
R.Z. Liu, Q.W. Duan, W.W. Gu, H.Y. Jin, S.C. Xu and J.F. Yang	
Fabrication of Porous SiC/SiAlON Composites Using Semi Coke and Fly Ash as Raw Material	347
Q.W. Duan, R.Z. Liu, H.Y. Jin, J.F. Yang and Z.H. Jin	
Prediction of the Flow Stress of a High Alloyed Austenitic Stainless Steel Using Artificial Neural Network	351
Z.H. Zhang, D.N. Yan, J.T. Ju and Y. Han	
Experimental Study on Intensified Leaching of Vanadium Ore	355
J. Zhu, J.K. Guo, J.J. Xue and X. Li	

Precipitation Behavior of High-Nitrogen Low-Nickel Austenitic Stainless Steel at Intermediate Temperature	
D.N. Zou, R. Liu, J. Li, K. Wu and X.H. Liu	359
The Effect of Porosity of CBN Grinding Tools on Grinding Properties	
X.H. Yang, J.F. Yang, J.G. Bai and S.C. Xu	363

E. Biomaterials

Modified Distillers' Grains by Microwave-Assisted Hydrolysis for Cu²⁺ Adsorption from Aqueous Solution	
R.R. Su, Y. Chen, Y.F. Zhou, X.Y. Lin, J. Feng and J.Q. Rao	369
Synthesis of Glycerol Carbonate from Biomass Glycerol: Focus on the Calcination Temperature	
J.H. Baek, Y.B. Ryu, M.H. Kim, M.J. Moon and M.S. Lee	374
Preparation and Microstructure of Biomorphic Hydroxyapatite Using Extracted Beech Wood Template	
G.Y. Hou, Z.H. Jin, J.M. Qian and G.Q. Zheng	378

F. Energy Related Materials, Carbon Materials

Thermoelectric Properties of Solid-State Synthesized Magnesium Silicides Doped with Group B^{I-III} Elements	
S.W. You, S.M. Choi, W.S. Seo, S.U. Kim, K.W. Jang, J.I. Lee, S.C. Ur and I.H. Kim	385
Influence of Composition of Gd-Doped Ceria Electrolyte on Performance of Solid Oxide Fuel Cell	
Y. Ibusuki, Y. Hirata, S. Sameshima and N. Matsunaga	389
Fabrication of Novel Ag-Paste and Evaluation of its Electrical Properties in Bulk-Si Solar Cell	
J.H. Jeong, S.J. Kim, C.R. Son, S.C. Ur and S.Y. Kweon	393
Dye Sensitized Solar Cells Based on ZnO Nanorod/TiO₂ Nanoparticle Composite Films	
H. Tong, M. Inada, Y. Tanaka, N. Enomoto and J. Hojo	397
A Study on Fabrication, Dispersion and Surface Coating of Nanocarbon for MgO-C Refractories	
K.J. Jeong, J.H. Son, S.S. Lee and D.S. Bae	404
Development of Nano-Carbon Bucky-Paper Membranes for Membrane Distillation	
J.W. Koo, J.H. Han, S.H. Lee, J.S. Sohn and J.S. Choi	408
Synthesis and Characterization of Sulfonated Poly(diphenyl ether ketone sulfone)s Containing Dibenzoylbenzene Moiety for Proton Exchange Membrane Fuel Cell	
M.A. Hossain, Y.D. Lim, D.W. Seo, S.H. Lee, H.C. Lee, H.H. Jang, M.M. Islam and W.G. Kim	412
Nano Composite Membranes of Sulfonated Poly(ether sulfone)s Containing DHTPE and SiO₂ for PEMFC	
Y.D. Lim, D.W. Seo, S.H. Lee, M.A. Hossain, H.C. Lee, I.S. Jung and W.G. Kim	416
Research on Electrothermal Properties of a Composite Carbon Fiber Paper	
J. Zhou, L. Wu, X.Z. Lan, Q.L. Zhang, X.Y. Chen and X.C. Zhao	420
Thermal Decomposition Characteristics of Mg (NO₃)₂·6H₂O and MgCl₂·6H₂O Composite as Phase Change Material	
Q. Ding, X.G. Luo and X.Y. Lin	425

G. Others

Effect of Heat Treatment on Microstructures and Hardness of SiC/Steel Armor Composite	
J. Dong, J. Pan, M. Wang, C.R. Zhang, W. Liu and Z.L. Lv	431
Inspection of the TFT Devices Using the Low-Energy Electron Beam Emitted from the Microcolumn	
T.S. Oh, S.J. Ahn, S.J. Ahn, D.W. Kim and H.S. Kim	435

Fast Inspection of Non-Visual Defects in the Wafer Surface Using Two Low-Energy E-Beam Sources	
S.J. Ahn, T.S. Oh, D.W. Kim, H.S. Kim and S.J. Ahn	439
Synthesis of Al₂O₃/TiAl <i>In Situ</i> Composites from Ti-Al-TiO₂-Cr-V₂O₅	
K. Zhang, F. Wang and J.F. Zhu	447
The Effects of Catchment Materials and Treatment Train on Rainwater Quality in a Rainwater Harvesting System	
J.S. Mun, R.H. Kim and M.Y. Han	451
Influence of Addition of Waste Glass as a Fluxing Agent on the Bloating Phenomenon of Artificial Aggregates Fabricated from Coal Bottom Ash	
S.G. Kang, S.N. Jo and G.G. Lee	455
The Relationship between Viscosity and Electrical Conductivity of CaF₂-SiO₂-Al₂O₃-CaO-MgO Slag System	
J.T. Ju, Z.L. Lu, Z.Y. Jiao, J. Yang and Z.H. Zhang	460
Failure Analysis of ERW Seam Weld Pipeline in Internal Pressure	
R. Wang, D.F. Li, P. Yang, J. Han and X.L. Han	464
Study on the Rheological Properties of LLDPE/CaCO₃ Plasticized with the Fatty Acid Extracted from Hogwash Oil	
C.L. Yun, X.G. Luo, X.Y. Lin, H.P. Zhang, J.W. Li and P. He	468
The Behaviors of Removing Silver Ions by Low-Cost Expanded Rice Husk, Nature Diatomite and Nature Bentonite as Sorbents	
X. Liang, X.G. Luo, X.Y. Lin and Q. Mei	472
Investigation on Mechanical Properties and Formability of Cross Roll Rolled Ni-10Cr Alloy	
K.H. Song, H.S. Kim and W.Y. Kim	476
Investigation of Microstructure and Mechanical Properties of Friction Stir Lap Jointed Ni Base Superalloy	
K.H. Song and K. Nakata	481