

Table of Contents

Preface

Chapter 1: Ceramics and Ceramics-Matrix Composites

First-Principles Study of Polarization Behavior in BaTiO₃/PbTiO₃ Ferroelectric Superlattices Z.Y. Zhu, J. Bai, F. Lu and Q. Wang	3
Phase Structure of Nanocrystalline BaTiO₃ Powders via One-Step Solvothermal Route H. Zhang, X.H. Wang, Z.B. Shen and Y.N. Hao	8
Electrical Characterization and Microstructures of Bi_{4-x}Ho_xTi₃O₁₂ Ceramics X.A. Mei, M. Chen, J. Liu and R.F. Liu	13
Electrical Characterization and Microstructures of Bi_{4-x}Tm_xTi₃O₁₂ Ceramics B. Li, X.H. Yuan, M. Chen and X.A. Mei	17
Ferroelectric Characterization and Microstructures of Bi_{4-x}Lu_xTi₃O₁₂ Ceramics X.A. Mei, M. Chen, C.Q. Huang and R.F. Liu	21
Electrical Characterization and Microstructures of Bi_{4-x}Sc_xTi₃O₁₂ Ceramics Grown by Electroceramic Technique F. Tian, X.A. Mei, M. Chen and C.Q. Huang	25
Large Remanent Polarization of Bi₄Ti₃O₁₂ Films by Ho³⁺ Substitution M. Chen, X.A. Mei and C.Q. Huang	29
Ferroelectric Properties and Microstructures of Bi_{4-x}Lu_xTi₃O₁₂ Thin Films M. Chen, X.A. Mei and J. Liu	33
Electrical Characterization and Microstructures of Bi_{4-x}Sc_xTi₃O₁₂ Thin Films Grown by Pulsed Laser Deposition Technique F. Tian, X.A. Mei, M. Chen and C.Q. Huang	37
Preparation and Ferroelectric Properties of Bi_{4-x}Tm_xTi₃O₁₂ Thin Films B. Li, X.H. Yuan, M. Chen and X.A. Mei	41
Sol-Gel Synthesis of Nanocomposite Li₄Ti₅O₁₂/Carbon Nanotubes as Anode Materials for High-Rate Performance Lithium Ion Batteries X.W. Miao, H.M. He, L.Y. Shi, X.L. Zhao and J.H. Fang	45
An Electrochemical Impedance Spectroscopy (EIS) Study of Zn-Doped Li (Ni_{1/3}Co_{1/3}Mn_{1/3}) O₂ Cathode Materials in the First Delithiation Process L. Zheng, L.B. Liu, X.J. Zhou and Y.Z. Guo	50
Preparation and Electrochemical Performance of SnO₂/C-La_{0.3}Sr_{0.7}MnO₃ Composites for Li-Ion Anode Y.X. Yin, D.S. Ruan, M.Y. Chang, F. Hou and H.X. Wang	56
Preparation Technology of ITO Composite Oxides Nanopowder J.K. Yan, W.X. Tang, E.X. Ni, G.Y. Gan, G. Yang, Z. Shi, J.H. Du, J.M. Zhang, Y.C. Liu and J.H. Yi	61
Role of the Mg/Al Atomic Ratio in Catalyst Support for NO_x Storage/Reduction N. Zhao, J. Hu, W.J. Zhang and Y.T. Wang	66
First-Principles Study of the ZnO(1120) Structure and Ti Adsorption Z. Liang, G.Y. Gan, J.H. Yi, J.K. Yan, J.H. Du, J.M. Zhang and Y.C. Liu	70
Microwave Sintering and Electric Properties of ZnO Varistor Ceramics X.X. He, G.Y. Gan, J.K. Yan, J.H. Du, J.M. Zhang, Y.C. Liu, J.H. Yi and M.Y. Fan	75
Preparation of Acicular-Like ZnO Nanostructured Powder Using Ball Mill Zinc Powder by Hydrothermal Method W.X. Peng, K.J. Wang, J. Hu and Y.T. Wang	80
Photocatalytic Properties of (Fe, N)-Codoped TiO₂ W.X. Tang, E.X. Ni, J. Yuan, J.K. Yan, G. Yang, Z. Shi, G.Y. Gan, J.H. Du, J.M. Zhang, Y.C. Liu and J.H. Yi	84
Study on the Second Phases of (Y,Nb)-Codoped TiO₂ Ceramic E.X. Ni, W.X. Tang, S.L. Zhang, J.K. Yan, G.Y. Gan, G. Yang, Z. Shi and J.H. Yi	88

Pore Controllable Regulation and Laccase Immobilization of Hollow Mesoporous SiO₂/Fe₃O₄ Microspheres	
Q.Y. Li, Q.Q. Zhu, Q. Wei and Z.R. Nie	93
High Frequency Magnetic Properties of A Composite Material Prepared from Z-Type Hexaferrite and Bi₂O₃	
Z.H. Cao, M.G. Han, M.R. Guan, Z.J. Song and L.J. Deng	99
The Effect of Polyethyleneimine (PEI) on the Texture and Morphology of YBCO Films	
W.C. Xu, Y.L. Bai, J.H. Fang and C.B. Cai	103
Effect of Aluminum Dross on Properties of the Lightweight Mullite Aggregate	
G.S. Sun, H.Z. Gu, Y.N. Fang and Y.S. Feng	107
Current Distribution Model and Control Principle of MgAlON Composites by Spark Plasma Sintering (SPS)	
X.C. Feng, D.Y. Yang, Y.C. Qu, T. Wang and C.B. Zhang	111
Grain Refinement Mechanism of MgAlON Composites Prepared by Spark Plasma Sintering	
D.Y. Yang, X.C. Feng, Y.C. Qu, F. Yuan and C.B. Zhang	115
Microstructure Homogeneity, Crack Propagation and Self-Toughening of Solidified TiC-TiB₂ Composite Prepared by Combustion Synthesis in Enhanced High-Gravity Field	
Y.L. Song, Z.M. Zhao, L. Zhang and S.J. Wang	120
Melt Modification and Microstructure Homogeneity of Solidified TiC-TiB₂ Composites Prepared by Combustion Synthesis in Ultrahigh Gravity Field	
H. Zhang, Z.M. Zhao, L. Zhang and S.J. Wang	125
Cover Confinement and Ballistic Performance of TiC-TiB₂ Ceramic Armor under the Impact of Long-Rod KE Penetrator of 1400 m·s⁻¹	
X.B. Lu, H.B. Liu and H.X. Lu	130
Multiscale and Multilevel Composite of Solidified TiC-TiB₂ with Ti-6Al-4V Achieved by Fusion Bonding in High-Gravity Field	
Z.M. Zhao, L. Zhang, S.J. Wang and M.Q. Wang	136
Pyrolysis Kinetic Behaviors of ZrB₂ Ceramic Organic Precursor	
M.W. Chen, H.P. Qiu, J. Jiao, W.G. Zhang, X.Q. Li, Y. Wang, S.Y. Gao and R.G. Wang	142
Study on Process and Properties of Needling Silica Fiber Reinforced Silica Composites	
Q.H. Wei, C.H. Wang, H.S. Wang, L. Li, C.T. Shao and B. Dong	146
Fabrication and Properties of 3D-C_f/Mullite Composites with SiC Interfacial Coatings	
K.W. Dai, C.C. Zhang, Q.S. Ma and H.T. Liu	150
Numerical Simulation of Pre-Crack Propagation in ZrB₂-SiC-AlN Ceramics Subjected to Thermal Shock	
X.Y. Wan, J. Liang, G.D. Fang and L.L. Wang	154
Pore Structure and Mechanical Properties of ZrC/SiC Multi-Components Modified C/C Composites	
X.Q. Li, H.P. Qiu and J. Jiao	159
Microstructure of Al₂O₃+Cordierite+AlN Composite Ceramics	
Z.X. Ma, Y.L. Han, N. Wang, W.N. Liu and Y.W. Liu	165
Effect of Solid Loading on Properties of All-Ceramic Crown by Gel-Casting Technique	
P. Zhang and H.Y. Guan	169
Influence of different Thickness of Zirconia Core on the Flexural Strength in Article Saliva	
G.X. Yu, L. Wang and Z. Fan	173
Effect of Different Surface Treatments on Push-Out Bond Strength of Zirconia Oxide Posts	
G.X. Yu, S. Zhang and Z. Fan	177
Comparative Measurement on Translucency of Four Systems of Dental All-Ceramic Zirconia Materials	
R.J. Lu, C. Ge, L. Sun, G. Shi, C.L. Wang, L.Q. Shao, Y.H. Liu, N. Wen and B. Deng	181
Comparative Measurement on Transmittance of Four Systems of Dental All-Ceramic Zirconia Materials	
B. Deng, J. Xu, G. Shi, L.M. Liang, Y.F. Yi, L.Q. Shao, N. Wen, B. Gu, Y.H. Liu and J.H. Chen	185
Effect of ZrO₂ Coating on the Properties of Porous Silicon Nitride	
R. Liao, H.S. Wang, C.H. Wang, C.L. Zhou, J. Liu and Q.H. Wei	189
Study on the Microstructure of Lining-Ceramic Layer	
N. Wang, Y.L. Han, Y. Zhang, C. Wang and S.C. Guo	193

Preparation of $\text{La}_2(\text{Ce}_x\text{Zr}_{1-x})_2\text{O}_7$ Nano-Porous Powders via Citric Acid Derived Sol-Gel Processing	
L. Zheng, J.Q. Guo, L.B. Liu, Y.X. Tang and Y.Z. Guo	197
A Review of Coating Preparing Techniques of Bioactive Glass	
C.Z. Chen, X.G. Meng, H.J. Yu, H. Yang, T. He, D.G. Wang and S.G. Zhao	202
Effect of Al_2O_3 on the Glass-Ceramics of $\text{CaO-SiO}_2\text{-MgO-Al}_2\text{O}_3$ System Based on BOF Slag	
W.B. Dai, Y. Li, Y.Y. Zhou, D.Q. Cang and Y. Fan	208
Fabrication and XRD Study of Lithium Silicate by Solid-State Reaction	
Y.D. Cao, J. Hu, H. Tang, Y.T. Wang and W.J. Zhang	213
Preparation and Mechanical Properties of $\text{TiN-Al}_2\text{O}_3$ Refractory Composites	
H.T. Liu, M.H. Fang, Z.H. Huang, H.P. Ji, X. Min, Y.G. Liu and X.W. Wu	217
Influence of the Binder Amount on the Properties of the Non-Sintering $\text{Ti(C,N)-Si}_3\text{N}_4\text{-SiC}$ Composite Refractories	
B. Tan, K. Chen, Z.H. Huang, M.H. Fang, Y.G. Liu and X.W. Wu	221
Application of High Radiative Coating on Hot Blast Stove and Heat Balance Calculation	
L.H. Zhao, X.B. Ai, D.Q. Cang and Y. Li	225
Phase Transformation of Diatomite during Magnesiothermic Reduction Process	
S.Y. Liu, M.H. Fang, Z.H. Huang, H.P. Ji, X. Min, Y.G. Liu and X.W. Wu	230

Chapter 2: Metals and Metal-Matrix Composites

Determination of Coating Thickness by Crater Grounding Method	
X.J. Li, C. Zhang, N. Zhang, S.T. Miao, D.L. Guo and L.H. Zhang	237
Study on the Performance of Aluminum Thick Film Contacts for Silicon Solar Cells	
M. Fu, H.Y. Li, G.L. Jin, L. Fan, D. Chen and Z. Feng	241
Preparation and Performance of Titanium Matrix Anodized Oxide Coating Anode Ru-Ir-Ti/Ti	
L. Su, J. Hu, Y.T. Wang, W.J. Zhang and Y. Li	247
Research Progress in Laser Clad Nickel-Based Alloy Coatings	
H.J. Yu, T. He and C.Z. Chen	252
Fabrication and Plasmas-Relevant Properties of $\text{B}_4\text{C/Cu}$ Coating FGM	
C. Sun, Y.K. Li, H. Wang and C.C. Ge	257
Preparation and Mechanical Property of MWNTs/Al Composite Wires by Rotational Friction Extrusion Processing	
Q.P. Xiong, L.M. Ke, F.C. Liu, Q. Liu and X.L. Chen	261
On the “Ceramic Constrained by Metal” Composite Materials	
C. Sun, Y.K. Li, H. Wang, M.M. Wan, Y.F. Wang and Q.Z. Jiang	266
Hot Deformation Behaviors of SiCp/2024 Aluminum Composites	
S.M. Hao and J.P. Xie	271
Preparation of Graphene Nanosheets/Copper Composite by Spark Plasma Sintering	
D. Qu, F.Z. Li, H.B. Zhang, Q. Wang, T.L. Zhou, C.F. Hu and R.J. Xie	276
The Effect of Ball Milling on the Electrochemical Behavior of Silicon Composite Electrode	
Z.S. Wen	280
Preparation and Magnetic Property of Carbon Nanotube/NiZnCo Ferrite Composite	
X.B. Zhou, H.F. Cheng, J.P. Wang, J. Lei, T.M. Huang, W.M. Pan and Q. Huang	286
Nonlinear Magnetostrictive Effect of Magnetorheological Elastomers	
S.L. Sun, X.Q. Peng and Z.Y. Guo	291
Effects of Na-Ca System Glass Powder on Properties of Silver Paste	
M.Y. Fan, G.Y. Gan, J.H. Yi, J.K. Yan, J.H. Du, J.M. Zhang, Y.C. Liu and X.X. He	295
Study on Structure and Properties of Porous Copper Alloy	
H. Zhong and Y. Zhou	301
Preparation, Structure and Properties of FeCrAl Honeycombs	
J. Yu, Y.J. Du and Y. Zhou	305
Synthesis and Physical Properties of Graphene Nanosheets Reinforced Copper Composites	
B.W. Wei, D. Qu, C.F. Hu, F.Z. Li, T.L. Zhou, R.J. Xie and Z.M. Zhou	310

Chapter 3: Polymers and Polymer-Matrix Composites

Abrasion Properties and Thermal Stabilities of Poly(vinyl chloride)/Diatomite Composites F. Zhan, N.C. Chen, X.H. Zhang, B. Huang, Z.N. Wu and Q. Zhu	317
Effecting Factors on Conductivity of EG/VER Conductive Composite H.Y. Zhang, H. Xu and C.S. Guan	322
Research on the Microstructure of Leather/Resin Composites H.Y. Zhang and X.J. Liu	326
Influence of the Particle Size of LDPE on the Performance of Cu/LDPE Composites Y. Tang, Y. Wang and X.P. Xia	330
Preparation and Characterization of Novel Acrylate Emulsiones with Ketone-Hydrazide Crosslinking Structure Based on Application of Reactive Emulsifier Z. Wu, C.Z. Zhong, Y. Song and Y.Q. Zhang	335
Improving the Dispersity and DC Breakdown of MgO/LDPE Nanocomposite by Adding EVA H. Zhao, S.Y. Peng and J.M. Yang	339
Structural and Electrical Transport Properties of the Type-I Clathrate Phase $\text{Ba}_8\text{Ga}_{16}\text{In}_x\text{Ge}_{30-x}$ D.C. Li and H.R. Wang	343
The Porosities or Voids Included in Composite Resin Restorations X.Y. Zhao, W. Zhang, S. Lee and C. Roggenkamp	349
Fluoride Release and Recharge Ability of a Novel Fluoride Release Composite Resin X.Y. Zhao, Y.J. Gui and S.B. Li	355
Study on Electrical Properties and Morphology Behaviors of Epoxy Nanocomposites with Octa(3-aminopropyl)Polyhedral Oligomeric Silsesquioxane X. Dong, J.F. Fu, W.Q. Yu, L.Y. Chen, L.Y. Shi, H.S. Jia and S.G. Chai	360
Dielectric and Energy Storage Properties of Polyvinylidene Fluoride/Barium Titanate Nanocomposites Y.X. Li, J.L. Xie, Z.M. Chu, X.S. Wang and X. Yao	365
Preparation and Properties of Transparent Side-Chain Fluorinated Polyurethane Elastomers Y.Q. Zhang, C.Z. Zhong, W. Xu, Z. Wu, Y. Zhang and Z.L. Jin	370
Preparation and Properties of Waterborne Side-Chain Fluorinated Polyurethane Y.Q. Zhang, C.Z. Zhong, W. Xu, Z. Wu, W.J. Chen and L.H. Zhang	374
The Preparation and Performance of Wear-Resistant Coatings C. Zhang, Y.T. Ding, X. Sun and S.G. Wang	378