

Table of Contents

Preface

v

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 Li₄Ti₃O₁₂/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 La₂(Ce_xZr_{1-x})₂O₇ 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 Al₂O₃ on the Glass-Ceramics of CaO-SiO₂-MgO-Al₂O₃ 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 TiN-Al₂O₃ 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 Ti(C,N)-Si₃N₄-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 B₄C/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 Emulsions 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 $Ba_8Ga_{16}In_xGe_{30-x}$ 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
Keyword Index	383
Author Index	387