

Table of Contents

Preface

Chapter 1: Raw Materials and Processing

Synthesis of Dispersed Y₂O₃ Nanopowder from Yttrium Stearate	3
J.S. Li, X.D. Sun, S.H. Liu, D. Huo, X.D. Li, J.G. Li, Q. Zhu and M. Zhang	
Preparation and Characterization of Gd₂Zr₂O₇ Nanoparticles via the Citric Acid Chelating Agent Method	8
L. Ma, W.M. Ma and X.D. Sun	
Preparation of Ultrafine Al(OH)₃ Powders from Scrap Aluminum	13
J. Xu	
Synthesis of LaFeO₃ Nano-Powders by Self-Propagating Combustion Method of Sol-Gel	17
Y.F. Zhu, W.L. Liu, A.H. Wu, Z.Q. Feng, C.Y. Wang and J. Xu	
Synthesis and Photo-Catalytic Properties Characterization of Graphene/TiO₂ Nanotube Composites	21
C.X. Li, L. Zhang, D.Y. Jiang and Q. Li	
Preparation of the Ceramic Hollow Balls of Aluminium Titanate-Based by Rolling-Ball Method	25
X. Liu, J.K. Li and X.Y. Gu	
Preparation of Porous Silicon by Magnesiothermic Reduction from Serpentine	29
B. Ma, Z.H. Huang, M.H. Fang, Y.A. Liu and S.S. Chen	
Effect of Ball Milling on the Properties of Zirconia Powder Prepared by Alcohol-Aqueous Coprecipitation Method	34
Y.F. Zhang, K.J. Wang and J. Hu	
Study on Extraction of Alumina from Sericite Phyllite	38
H.W. Zhao, K.Q. Liu, Z. Li and Z.H. Huang	
Preparation of High Performance SiC_f/SiC Composites through PIP Process	43
M.W. Chen, H.P. Qiu, J. Jiao, X.Q. Li, Y. Wang and H. Zou	
SiC-TiB₂ Composite Densified by Pressureless Liquid-Phase Sintering	48
Y.H. Chen, L.E. Wu, W.Z. Sun, Y. Jiang and Y.J. Lu	
Effect of Cerium Oxide on Sinterability, Microstructure and Properties of Anorthite-Based Glass/Ceramic Composites	52
W.X. Dong, Q.F. Bao, X.Y. Gu and Y.C. Huang	
Preparation and Characterization of Al₂O₃-Kaolin Composite Porous Ceramic Used as Ceramic Membrane Support	56
Q.B. Chang, K. Yang, X. Wang, K.K. Cheng, Y.Q. Wang and J.E. Zhou	
Preparation and Characterization of Nb₂O₅-Al₂O₃ System Ceramics with Different Al₂O₃ Additions	60
X.Z. Zhang, J.E. Zhou, Y.H. Jiang, C.R. Wu and C.Y. Lin	
Study on Preparation and Properties of Yttria Stabilized Zirconia Solid State Electrolyte	64
W. Liu, G.M. Liu, N.S. Peng and D.Z. Sun	
Synthesis and Properties of Composite Stabilized ZrO₂	68
J.H. Cui, T. Feng, J.F. Xia, D.Y. Jiang, G.M. Liu, N.S. Peng and Q. Li	
Preparation and Characterization of Pt/YSZ Electrode of Zirconia Oxygen Sensor	72
Q. Han, G.M. Liu, N.S. Peng, T. Feng, J.F. Xia and J. Xia	
NiO Sensing Electrode for NOx Detection at High Temperature	76
T. Feng, J.F. Xia, H.Q. Nian, D.X. Huang, H.F. Xu, Y.L. Li, B. Xu and D.Y. Jiang	
A Review on Fabrication Methods of BiFeO₃ Thin Films	81
Y.T. Huang, X.L. Fu, X.H. Zhao and W.H. Tang	
Study on Performance of Ru-Ir-Ti/Ti Oxide Coating Anodes Prepared with Method of Surface Nitriding on Titanium	87
D. Qu, J. Hu, C.F. Hu, Y.T. Wang and L. Su	
The Mechano-Chemical Synthesis and Characteristics of PMN and PZT	92
W.C. Shi, C. Chen, H. Wu, D.Y. Jiang and Q. Li	

Preparation and Properties of Sr₂NaNb₅O₁₅ Lead-Free Piezoelectric Ceramics by Sol-Gel Method	
T.H. Zhang, J.Q. Zhao, Y.A. Liu, Z.H. Huang and M.H. Fang	96
Preparation of High Performance Pt Counter Electrodes on Conductive Plastic Substrate for Flexible Dye-Sensitized Solar Cells	
Y.Q. Wang, Q.H. Zhang, H.Z. Wang and Y.G. Li	101
Effect of Vitique Esthetic Cementation on Tetracycline Stained Teeth-Mask with Different Simulated Staining Levels Following IPS-Empress II Ceramic Veneers	
H. Fan, R.Y. Liu, D.D. Jing, L.J. Chen, Y.K. Zhang, L.Z. Lai and L.Q. Shao	105
Effects of Graphite Mold on Cooling Process of Fused AZS 33# Refractory	
F. Yuan, D.Y. Yang, T. Wang and Z. Li	110
Preparation of the Sulfur-Free Expanded Graphite Using Induction Heating Method	
Z.T. Wang and Y. Wang	115
Preparation and Properties of Bacteriostatic Sponge	
N. Yang, Q.M. Zhang and Y.F. Wang	120
Influence of Bentonite on Properties of Glass-Based-Sintering Material for Borehole-Wall Renovation	
C. Yang, Z.J. Li and B.L. Liu	124
Study on Joining of ZrO₂ Tape-Casting Substrates and Adhesive Mechanism	
Y. Tu, W.H. Hou, T. Feng, D.Y. Jiang and Q. Li	128

Chapter 2: Chemical Composition and Microstructure

Measurement and Characterization of the Particle Size of Refractory Corundum	
F.R. Yang, K.Q. Liu, B.J. Wang and X.H. Xie	135
Effects of Sol Network Modifiers on Preparation, Morphology and Phase Composition of Zirconium Diboride Nano-Powders by Novel Sol-Gel Technology	
G.Y. Ji, H.M. Ji and X.P. Li	139
Preparation and Characterization of Hydrophobic Silica Aerogel by Ambient Pressure Drying Method	
H. Xu, G.L. Fu, Y.Q. Guo, J.C. Tu and Y. Chen	144
Synthesis and Characterization of FeO⁺ Nanosheets	
J. Guo, C.X. Li, L. Zhang, J.F. Xia, D. Jiang and Q. Li	148
The Preparation and Characteristics of MMT Nanosheets	
C. Chen, H. Wu and Q. Li	152
Properties Related Phase Evolution in Multilayer Silicate Ceramics	
K. Boussois, N. Tessier-Doyen, D. Chateigner and P. Blanchart	156
Grain Boundary Phase Analysis for Y₂O₃-Doped AlN Ceramics	
F.F. Mao, X.H. Wang, Q. Zheng, F.Q. Zhang, Z.Q. Zhang and H. Gu	162
Joining of C/SiC Composite and TC4 Alloy Using 70Ag28Cu2Ti Active Brazing Alloy	
J.K. Li, X. Liu and J.E. Zhou	167
Study on the Gemological Characteristics of Amber from Myanmar and Chinese Fushun	
Q.Y. Xing, M. Yang, H.X. Yang and E.D. Zu	172
The Study on Composition and Heat Treatment of the Fei-Color Jade	
M. An, D. Ye, Q.Y. Xing and E.D. Zu	178
Study on the Microstructure of Inorganic Fullerene-Like WS₂	
T. Zhang, T. Ma, P.G. Gao, F.C. Shen and J.C. Zhang	183
The Influence of Alumina Addition on the Microstructures of YSZ	
Z.Q. Meng and D.Y. Jiang	187
Microstructure Analysis of the ZrO₂/Al₂O₃ Multi-Phase Ceramics	
Z.W. Chen, J.Y. Niu, L. Feng, D.W. Liu and X.B. Wei	191
Study on the Microstructure and Morphology of Sintering Process of SiC-TiB₂ Composite	
L. Jiang, Y.W. Bao, Y.H. Chen and J. Wei	196
Microstructure Observation and Analysis of Sintered SiC Ceramics by SEM	
Y. Jiang, L.E. Wu and Z.K. Huang	200
Textural Properties of Nanocrystalline Hydroxyapatite Synthesized via a Microwave-Hydrothermal Process	
Y.Z. Wang, S.H. Luo and Y. Fu	205

Influencing Factors of Macrosporous Ordering in TiO₂ and ZrO₂ Inverse Opals	209
H. Zhang, X.L. Xu, F. Li, B.B. Jin and S.L. Zhao	
Doping Effect of Alkali Ions on the Microstructural and Electrical Properties of ZnO-Pr₆O₁₁-Based Varistor Ceramics	213
Z.J. Peng, F. Jiang, H. Feng and X.L. Fu	
A Review of the Influential Factors on the Ferroelectric Domain Structure in BiFeO₃ Thin Films	219
Y.T. Huang, X.L. Fu, X.H. Zhao and W.H. Tang	
Effect of Ar Pressure on Properties of Polycrystalline CdZnTe Films	226
B.L. Yao, J. Huang, L.M. Cai, K. Tang, B. Ren, J. Zhou, J. Le, L.Y. Shen, Y. Zhu and L.J. Wang	
Effect of Oxygen Partial Pressure on Properties of ZnO Films Deposited on Freestanding Diamond Films	230
K. Tang, L.J. Wang, J. Huang, B. Ren, J. Zhou, J. Le and Y.B. Xia	
Properties of Li-Doped ZnO Films Deposited on Diamond Films	234
M.A. Lin, L.J. Wang, J. Huang, K. Tang, B. Ren, J. Zhou and Y.B. Xia	
Interfacial Reactions between Polymer Derived SiC Fiber and Ti₃Si(Al)C₂	238
J.W. Zhang, C.F. Hu, Y.G. Wang, Q. Huang and P. Cui	
Crystal Structure Stabilization of Gadolinium Aluminum Garnet (Gd₃Al₅O₁₂) and Photoluminescence Properties	245
J.K. Li, J.G. Li, X.L. Wu, S.H. Liu, X.D. Li and X.D. Sun	
Structural Features and Color Tunable Photoluminescence of the Binary and Ternary Layered Rare-Earth Hydroxides of (Y,Ln)₂(OH)₅NO₃·nH₂O (Ln=Tb, Eu)	252
X.L. Wu, J.G. Li, J.K. Li, S.H. Liu, X.D. Li, X.D. Sun and Y. Sakka	
Structure and Luminescence Characteristics of Yttrium Hydroxide Nanosheets Doped with Tb³⁺	259
L. Zhang, C.X. Li, D.Y. Jiang, T. Feng and Q. Li	

Chapter 3: Mechanical and Physical Properties

Theoretical and Experimental Studies on Strength and Stiffness of Vacuum Glazing	265
X.G. Liu and Y.W. Bao	
Mechanical Properties of Dental Porcelain Discs by Different Producing Methods	271
H.T. Wang, Y.H. Liu, Y. Wang, H.J. Chen, Y. Qiu and Y.W. Bao	
Preparation and Mechanical Properties of a Novel Biomedical Magnesium-Based Scaffold	276
X. Zhang, X.W. Li, J.G. Li and X.D. Sun	
Effect of Nb₂O₅/La₂O₃ Additions on Mechanical Properties of Al₂O₃ Ceramics Prepared by Microwave Sintering	281
Y.L. Ai, N. Jiang, F. He, B.L. Liang and W. He	
Effects of Calcium Hexaluminate Addition on the Mechanical Properties of Zirconia-Toughened-Alumina	286
M.L. Hu, M.H. Fang, S.S. Chen, T. Yang, Z.H. Huang and Y.G. Liu	
Study on Mechanical Properties and Toughening Mechanism of MWCNTs/Ti(C, N) Cermets-Based Composites	291
S.Q. Liu and W.L. Liu	
Comparisons of Microstructures and Hardness Distribution between Clinocardium Californiense and Veined Rapa Whelk Shells	295
H.M. Ji, Y. Jiang, W. Yang, G.P. Zhang and X.W. Li	
Effects on Cold Modulus of Rupture and Cold Crushing Strength of One Low Cement Refractory Castable (LCRC)	299
K.M. Li, F. Xue, J.L. Xie, C.Y. Li, L.P. Li, G.W. Lin, C.C. Pan and L.L. Zhang	
The Influence of Steel Cover Thickness on Ballistic Performance of Confined TiC-TiB₂ Ceramic Tiles against the Impact of Long-Rod Tungsten Alloy Penetrator of 1.4 km · s⁻¹	304
C.Z. Pan, Z.M. Zhao, L. Zhang and J. Zhang	
Ballistic Performance of TiC-TiB₂ Composite Armour under the Impact of Long-Rod Tungsten Alloy Projectiles of 1.4 km · s⁻¹	310
X.G. Huang, Z.M. Zhao and L. Zhang	
Properties Analysis of Corundum Castables and Corundum MA Spinel Castables	316
C.D. Ding, G. Zhang and J.H. Yang	

Evaluation of High Temperature Interfacial Bonding Strength of Ti₃SiC₂-Al₂O₃ Joint in Air	321
D.T. Wan, Y.W. Bao, X.G. Liu, Y. Tian and R.R. Li	
Cyclic Contact Fatigue of Dental Porcelain	326
H.J. Chen, Y.H. Liu, Y. Wang, Y. Qiu and Y.W. Bao	
Effect of Coupled Conditions of Thermal Cycle and Dump Environment on Microstructure of 5mol% Yttria Stabilized Zirconia	330
J.F. Xia, G.M. Liu, N.S. Peng, T. Feng, H.F. Xu, D.X. Huang and D.Y. Jiang	
The Chemical Plating Copper of the SiC Particles and Thermal Expansion Behavior of the SiCp/Cu Composites	334
M. Hu, Y.L. Zhang, Y.J. Liu and J. Gao	
Thermal Stress Analysis of Photovoltaic Hollow Glass Based on ANSYS	339
W.H. Li, C. Li and Y. Qiu	
Effect of CrTiAlN Coatings on High-Temperature Oxidation Behavior of H13 Steel	343
H. Zhang, S.W. Duo, X.Y. Fei, X.M. Xu, T.Z. Liu and Y.B. Wang	
Fabrication and Oxidation-Resistance Property of Coated ZrB₂-YAG-Al₂O₃ Multi-Phase Ceramics	347
J.G. Song, F. Wang, M.H. Xu, S.B. Li and G.C. Ji	
Corrosion Behavior of ZrO₂-Mo Composite in Na₂SO₄ Solution	351
H.Q. Nian, J.F. Xia, T. Feng and D.Y. Jiang	
Preparation and Thermoelectric Properties of Ca₃Co₄O₉ Ceramics with Parallel Sheet Shaped Pores	355
H.D. Wang, X.D. Sun, X.Y. Ding, M. Zhang, X.D. Li, J.G. Li, D. Huo and S.H. Liu	
Photoluminescence Characteristics of Sol-Gel Derived ZnTiO₃ Doped with Ni²⁺ Ion	360
Y.H. Yu, M. Xia, L.L. Liu and W.J. Wu	
Research on Electrode Propertie of Heater for Planar Oxygen Sensor	364
Z. Wang, T.B. Wang, J. Yang, T. Feng, J.F. Xia and D.Y. Jiang	
NO₂ Response of Solid Electrolyte Sensors Made Using ZnFe₂O₄ Electrode	368
Q. Wang, W.H. Hou, T. Feng and D.Y. Jiang	
Effect of NO₂ Concentration on Sensitivity for High Temperature Impedancemetric NO_x Sensors	372
H.Q. Wang, G.M. Liu, N.S. Peng, T. Feng, J.F. Xia, D.Y. Jiang and X.C. Yang	
Bonding and Electrochemical Property Test of Zirconia Ceramics	376
C.T. Huan, D.Y. Jiang, G.M. Liu and Q. Li	
The Effect of Liner Thickness on the Color of Y-TZP Based All-Ceramic Restorations	380
R.Y. Liu, Y.K. Zhang, S.Y. Zhou, C. Hu, D.D. Jing, H. Fan and L.Q. Shao	
Study on Biocompatibility of Nano-TiO₂ / Titanium Alloy	384
H. Liu, L.Q. Guo and J.M. Cheng	
Test of Relative Translucency for Four All-Ceramic Core Material after Veneering Ceramic	388
J.F. Chen, L.S. Zhao, Y. Zhao, B. Deng, B. Gu, Y.F. Yi, L.Q. Shao, Z. Wang and N. Wen	
A Comparative Study on Relative Translucency of Four Dental All-Ceramic Core Materials	392
G. Shi, J. Xu, L.M. Liang, Y.F. Yi, L.Q. Shao, N. Wen, B. Gu, Y.H. Liu, R.J. Lu and B. Deng	
Effect of Post-Core Materials on the Color Value of Four Dental All-Ceramic Cores	396
R.J. Lu, C.L. Wang, J.C. Zou, Y.F. Yi, L.Q. Shao, N. Wen, B. Gu, Y.H. Liu and B. Deng	
Performance Research on Photovoltaic/Thermovoltaic Solar System in Building Integrated Photovoltaic (BIPV)	401
C.G. Wei and Y.W. Bao	
Research on Performance of Photovoltaic Insulating Glass Modules in Building Integrated Photovoltaic (BIPV)	405
X.Y. Den, X.L. Wu and C.G. Wei	
Early Age Property Study of Phosphate Cement by Electrical Conductivity Measurement	409
Z. Ding, X.D. Wang, B.Q. Dong, Z. Li and F. Xing	
Testing and Evaluation on the Chloride Ion Penetrability of Concrete under Compressive Stress	415
Y.C. Jiang, D. Huo, H.W. Teng and J.N. Xu	
The Research on Jadeite-Jade Lavender Based on CIE DE2000	421
S. Wang, H. Wang, Y. Guo and J.H. Zhao	

- Absorption Enhancing Effect of Sodium Dodecyl Sulfate on Metformin Hydrochloride in Rat Colon**
D.D. Jing, Y. Liu, R.Y. Liu, H. Fan, G.F. Li and L.Q. Shao 426

Chapter 4: Testing Technique and Devices

A Sample Holder for X-Ray Powder Diffraction Studies of Flakiness and Block Sample H.Y. Zhang, X.J. Liu, H.Y. Sun and C.S. Fan	433
Investigation about Dilution Ratio Effect on X-Ray Intensity P. Dai, Y.B. Liu, R. Yan and Y.Z. Zhang	437
Research on Influence of Diffractometer Slits on XRD Pattern H.Y. Zhang, Y.M. Xia, X.J. Liu and T.D. Li	441
Determination and Evaluation of Dead Time for X-Ray Fluorescence Spectrometer R. Yan, Y.B. Liu and P. Dai	445
Resonant Inspection of Ceramic Tiles E. Eren Gültekin, S. Kurama, G. Stultz and S. Sorensen	450
Thermal Fatigue of Ceramics: Theory, Life Predication and Characterization Methods D.D. Guo, X.Q. Hou and S.Q. Liu	455
Measuring Isostatic Pressing Strength of Hollow Glass Microspheres' by Mercury-Injection Apparatus Y. Wang and S. Peng	460
Experimental Research on Granule Moisture Measurement by Microwave Resonance Technology in a Fluidized Bed Dryer Y.H. Xie, L. Chen, C.H. Lin and S. Du	466
Testing and Evaluation of Mechanical Properties for Anisotropic Engineering Materials with Varied Loads H.L. Zhu, L.F. Yu, J. Ni, X. Wang and R.A. Luo	471
The Study of Equipment for Testing High Temperature Elastic Modulus Based on the Acoustical Resonance Method Y.F. Qiu, Q.Z. Niu, Y. Qiu and Y.W. Bao	476
Development of the Coaxiality Calibration System Based on the American Standard ASTME1012 J. Xu and K.X. Chen	481
Usability of Effective Medium Model for Microwave Absorbing Ceramics Z.Y. Zeng, H. Liu and Y.M. Guo	485
Three-Dimension Impedance Representation for Microwave Absorptive Ceramics H. Liu, Z.Y. Zeng and Y.M. Guo	489
The Difference of Jadeite-Jade Lavender under Three Light Sources J.H. Zhao, D.P. Chen, Y. Guo and S. Wang	493
Study on Minimum Teeth without Undercutting of Involute Gears with 14.5 Degree Pressure Angle C. Zhang, J.N. He, Y. Gao and X.L. Deng	497
The Programming of Dentistry CCS/CCM Software Y. Zhao, L.S. Zhao, J.F. Chen, B. Deng, B. Gu, Y.F. Yi, L.Q. Shao, Z. Wang and N. Wen	502
Improve the Profit from Principal Operations of Our Listed Ceramic Companies through Test Technology and Quality Management R.H. Hua	507