

Table of Contents

Preface, Organizing Committee, Sponsor

Chapter 1: Technique and Methods for Testing and Analysis of Materials

Effect of Preparation Process on Bending Modulus and Strength of Fiber Tubes in Radial Direction	
Z. Liu, C.L. Hu and Y.W. Bao	3
An Improved Cross-Bonded Method for Measuring Interfacial Bond Strength of Adhesives	
D.L. Ma and Y.W. Bao	8
An Introduction to Dynamic Load Test on Photovoltaic Modules	
D. Wang and C.G. Wei	13
Research of Nominal Operating Temperature Testing Method of BIPV Module	
C.G. Wei, R.N. Pan and D. Wang	18
The Analysis of Influence Factors in Cement Strength Test	
X.B. Yan, X.F. Wang and C.G. Wang	23
New Characterization Method of Hot Metal Penetration Resistance for Blast Furnace Carbon Blocks	
Y.W. Li, Y.W. Li, S. Ge, Y.C. Yin, Q.Y. Zhu, Z.Q. Liu and S.B. Sang	28
Characterization of Test Methods of Capillary Pressure of Cement-Based Materials	
J.L. Zhang, Q. Tian, Y.J. Wang and M. Li	33
Analyze of the Stress-Birefringence of the Fused Silica with Large Aperture	
Z.F. Shao, J.J. Wang, H. Wang, H.J. Wang, L.J. Nie, X. Zhang and Y.W. Bao	38
Determination of Phthalate Esters in Plastic Track Surface Layer Material by Gas Chromatography	
P. Chen, D.H. Xu, Q.D. Yuan and S.H. Liu	43
Fluoride Determination by Ion Chromatography in Fluorocarbon Coatings	
D.H. Xu, S.H. Liu and P. Chen	50
Composition Analysis of an Unknown Redispersible Powder	
J.J. Ding, W.Y. Zhao, H.Y. Guan, X. Li and Y.F. Mei	55
Correction of Loss on Ignition in Slag Powder by ICP-AES	
M. Li, Q.N. Li, M.Y. Wang, D.H. Xu and Q.D. Yuan	60
Determination of ZrO_2 and TiO_2 in Alkali-Resistant Fiberglass Mesh by ICP OES	
Q.D. Yuan, L. Cong, P. Chen, S.H. Liu and Q.N. Li	65
ICP-AES Determination of Sulfide and Sulfate Content in Pebble and Crushed Stone	
Q.N. Li, M. Li, Q.D. Yuan and D.H. Xu	70
Ion Chromatography for the Continuous Determination of Sulfite and Sulfide in Gypsum and Gypsum Products	
D.H. Xu, P. Chen and S.H. Liu	75
Preliminary Discussion of the Detection Method for Asbestos	
W. Han, L. Cong and P. Chen	80
Measurement of Multilayer Film Thickness Using X-Ray Fluorescence Spectrometer	
L. Zhang, M. Li, H.J. Li and X. Song	85
Rheological Measurement of <i>In Situ</i> Preheating Polycarbosilane Melt	
L.Y. Huang, Z. Zhu, X. Cheng and Y. Zhang	90
Determining Zero Shear Viscosity of Polycarbosilane Melts	
Z. Zhu, L.Y. Huang, X. Cheng and Y. Zhang	95
Determining Anisotropic Young's Modulus of Ceramic Coatings by the Relative Method	
Z. Liu, Y.W. Bao and G.L. Nie	100
Measurement for Elastic Modulus of Ultra-Thin Glass by Cantilever Beam Method	
X.G. Liu, Y.W. Bao and D.T. Wan	105
Evaluating Thermal Expansion Coefficient of SiC Coatings by Relative Method	
R.N. Pan, C.G. Wei, Y.W. Bao, D.T. Wan and Y.P. Wang	110

Monitoring Early Hydration of Concrete with Ground Penetrating Radar	115
Y.P. Tian, D.C. Huang and B. Li	
Patent Analysis of Concrete Testing Technology	120
P.F. Huang	

Chapter 2: Advanced Ceramics and Inorganic Composites

Structure and Characteristics of Carbon Nanotube Reinforced SiC Composite	127
Q. Li, Y.J. Zheng, J.F. Xia and D.Y. Jiang	
The Effect of Heat Treatment on the Microstructure and Mechanical Properties of KD-II SiC Fibers in Air	132
L. Li, K. Jian and Y.F. Wang	
Effects of Fiber Pre-Oxidation on Mechanical Properties and Microstructure of T700 Carbon Fiber Reinforced Mini C/SiC Composites	137
Z.H. Chen, S. Chen, J.T. Wu, H.F. Hu and Y.D. Zhang	
Microstructure and Mechanical Properties of ZrB₂-SiC-ZrSi₂ Composites Fabricated by Spark Plasma Sintering	143
C. Chen, C.C. Lv, C.B. Wang and Z.J. Peng	
Oxidation Behavior of Si-B-C-N Multiphase Ceramic	148
M.W. Chen, H.P. Qiu, W.J. Xie and H. Guan	
The Effect of Point Defects Induced by Fast Neutron Irradiation on the Thermal Conductivity of Boron Carbide	153
A.B. Du, Z.X. Qu, X.P. Su and X. Xiao	
Boron Carbide Hollow Microspheres Prepared by Polymer Derived Method	159
J.L. Wang, Y.Z. Gou, W.R. Ren, K. Jian and H. Wang	
Influence of Synthesis Process on Coated Properties of Al(OH)₃-Y(OH)₃/ZrB₂ Composite Powders	164
J.G. Song, X.Q. Wang, F. Wang, N. Liu, S.Z. Li, T.T. Xia, S.Y. Yu, S.B. Li and L. Chen	
Rheological Properties and Ceramization Mechanism of ZrO₂ Preceramic Solution	169
J.P. Ai, T. Zhou, X.P. Wang, S.S. Luo and W.K. Li	
Research on Optical Property of Black-Colored Zirconia Ceramics by Photoluminescence, Raman and Visible Reflectivity Spectra	174
Y. Xu, R.L. Fu, Y. Yang, J.D. Cai, X. Wang and P.F. Zhang	
Microstructures and Mechanical Properties of Y₂O₃ Ceramics	179
T.Y. Zhu and J.F. Xia	
Preparation of Superfine Alumina Powders via Hydrothermal Method	184
J.G. Song, R.H. Wang, X.Q. Wang, M.H. Xu and M.L. Ma	
Densification Mechanism of Al₂O₃/Al Metallic Ceramics Prepared via Powder Metallurgy Method	189
R.H. Wang, Y.Q. Li, S.Y. Yu, X.Q. Wang, J.G. Song, C. Yang, D.M. Du, F. Wang and S.B. Li	
Mechanism of Controlled Pore Structure of Quartz Pore Gradient Materials	194
F. Wang, X.Q. Wang, Y.Q. Li, X. Li, J.G. Song, S.B. Li, S.Y. Yu, G.L. Cao and S. Dong	
Synthesis of Silica Aerogel Using Silica Sol by Ambient Drying Method	199
D. Sun, X.Y. Sui, C.L. Zhou, N.H. Han and F.T. Liu	
Synthesis and Characterization of Pd/Ag/SiO₂ Nano-Composite Materials	204
J. Yang, B.S. Li, Z. Tong and R.H. Mu	
Preparation and Microwave Dielectric Properties of xBaZn₂Ti₄O₁₁-(1-x)BaNd₂Ti₄O₁₂ Ceramics	210
X. Wang, R.L. Fu, Y. Xu, Y. Yang, J.D. Cai and J.H. Luo	
Effect of Nd₂O₃ on the Microwave Dielectric Properties of 0.67CaTiO₃-0.33LaAlO₃ Ceramics	215
Z.M. Dou, G. Wang, J. Jiang and T.J. Zhang	
Sintering Behavior and Microwave Dielectric Properties of Li₂O-B₂O₃-SiO₂ Doped 0.67CaTiO₃-0.33LaAlO₃ Ceramics	220
G. Wang, J. Jiang, Z.M. Dou, F.F. Ning, E.T. Zhang and T.J. Zhang	
Domain Walls and Thermal Aging Stability of (K,Na)NbO₃-Based Ceramics in Tetragonal Phase	225
Y. Gao, H.Y. Zhao, F.T. Liu, X.B. Zhao, K.Z. Zhu and N.J. Song	

Reflectivity and Laser Ablation Behavior of $\text{La}_{1-x}\text{Sr}_x\text{TiO}_{3+\delta}$ Coating	230
J. Kong, L. Gao, Z. Ma, F.C. Wang and L.A. Yue	
Effect of Pore Size on Partial Discharge in Ultra-High Voltage Ceramic Capacitors	235
J.J. Chen, J.Y. Zhuang, Y.L. Hong and J.T. Huang	
The Investigation of Perovskite $\text{LaCo}_{0.6}\text{Ni}_{0.4}\text{O}_{3-\delta}$ as Cathode Interface Contact Material for Intermediate Temperature Solid Oxide Fuel Cells	240
Z. Li, D. Yan, Q. Zhang and J. Pu	
Synthesis and Conductivity Investigation of Cu Doped Apatite Type Lanthanum Silicate Electrolyte	245
W.Z. Li, Z.L. Huang, Z. Li and J. Chen	
Influence of Different Gd^{3+} Doping on the Upconversion Luminescence Properties and Morphology of $\text{NaYF}_4:\text{Yb},\text{E}_r$	250
C.P. Zhong, S.W. Duo and J.J. Zhang	
Investigation on the Preparation and Properties of Monodispersed Spherical $\text{Y}_2\text{O}_3:\text{Dy}^{3+}$ Phosphor	255
J.K. Li, Z.P. Liu, J.F. Luo, X.B. Ma, X. Teng and Z.M. Liu	
Investigation on Synthesis and Property of $\text{Tb}^{3+}/\text{Dy}^{3+}$ Co-Doped $\text{Gd}_3\text{Al}_5\text{O}_{12}$ Phosphor	261
X. Teng, B. Li, J.K. Li, G.B. Duan and Z.M. Liu	
Photoluminescence Properties of $\text{SrSi}_2\text{O}_2\text{N}_2$ Doped with Divalent Ytterbium Phosphor in Nitrogen-Rich Coordination	266
X.G. Gu, R.L. Fu and F. Yang	
Surface Morphology and Phase Transitions of Anodic TiO_2 Films Induced by Hydrothermal Exposure	271
Z.X. Chen, L.M. Ren, Y.H. Yan, X.W. Qi and Y.L. Yang	
Measurement and Characterization of $\text{CeO}_2\text{-TiO}_2$ Ion Storage Films for Electrochromic Devices	276
W.S. Wu, X.P. Liang, J. Wang, P. Chen, W. Zhang, K. Zhong, W.J. Sun, X.W. Fan and J.X. Li	
TA Assisted Synthesis and Properties of Porous ZnO	282
Y.Y. Li, T.Z. Liu, S.W. Duo, H.M. Xu and R.F. Zhong	
Influence of CeO_2 Doping on Property of SnO_2 Ceramics	287
Q.L. Wang, X.Y. Huang, J. Yin, J.F. Sun, M.X. Feng and L. Chen	
Effect of the Ratio of Co to Ni+Co on the Microstructures and Mechanical Properties of Ti(C, N)-Based Cermets	292
P. Wu, S.C. Liu and X.R. Jiang	
Hot-Press Sintering of $\text{TiC}_{0.5}\text{N}_{0.5}$-Based Cermets: Addition Effect of AlN Nano-Powder on Microstructure and Mechanical Properties	297
C.C. Lv, Y.J. Zhai, C.B. Wang and Z.J. Peng	
Effect of Deposition Time on Hardness and Bonding Strength of Magnetron Sputtered TiN Coatings on 316 Stainless Steel	303
H. Zhang, C.G. Luo, S.W. Duo, Q. Liu, R.C. Wen, M.Y. Yuan and Y.L. Wu	
Controlled Preparation and Characterization of Titanium Series Functional Pigment and its Application in Coatings	308
Y. Deng, J.X. Zheng, Q.Q. Wang, W.B. Yang and S.S. Zhang	
Comparison of Mo-10Nb Alloy Target Materials Prepared by Different Techniques	316
J. Gao, Y.J. Lu, J.F. Hou, Z.X. Yuan, W. Luo and B.Z. Hu	

Chapter 3: Nanomaterials and Applied Nanotechnology

The Electrochemical Deposition of Fe Nanowires and the Influence of Current Density on the Deposition Rate	323
T.T. Li, N.N. Wang, H.F. Cheng, W.Z. Wu and Y. Li	
Fluorescence Enhancement of Europium-Doped Yttrium Oxide Nanosheets Modified by HTTA	328
Q.M. Guan, Z.J. Li, F. Ma, L. Zhang and H. Miao	
Heterojunction Structure ZnO/TiO_2 Nanorods with Enhanced Photoelectrochemical Properties	333
W.J. Feng, L.Y. Lin, H.J. Li, Y.P. Gong and B. Chi	

Application of Improved BP Neural Network in the Preparation Processing of the CaCO₃ Nanocrystalline	
Q. Luo and Q.L. Ren	338

Chapter 4: Materials and Technologies in Environmental Engineering and Chemical Production

Bentonite-Copolymer Composite for Removing Basic Fuchsin	
Y.F. He, H. Li, Z.H. Zhang, T.J. Lu and R.M. Wang	345
The Preparation of Magnesium Hydroxide Whiskers	
Q.L. Ren and Q. Luo	350
Determination of Formaldehyde in Water-Borne Coatings by HPLC	
M.Y. Wang, Z.B. Guo, H.Y. Guan and M. Li	355
Facile Synthesis and Photocatalytic Performance of W₁₈O₄₉ Nanorods	
S. Wang, X.X. Bai and H. Zhang	360
Effect of Reaction Time on the Morphology and Photocatalytic Property of ZnO Nanoparticles	
X. Kong, Y.W. Hu and W. Pan	365

Chapter 5: Glass and Refractories

Preparation of Hollow Fiber Membrane Precursor from Glass and PVDF by Non-Solvent Induced Phase Separation	
J.W. Xu, Y.B. Zhang, Q. Lu, Q.L. Huang and C.F. Xiao	373
Laser Induced Damage in Fused Silica for 248 nm	
H. Wang, B. Fu, L.J. Nie, Z.F. Shao, Y.N. Jia and H.J. Wang	378
Microstructural Study on the Low Density SiO₂ Soot Body	
L.J. Nie, Y.N. Jia, L. Wang, Z.K. Xiang, F.X. Liu and H. Wang	383
Glass Surface Stress Measurement and Digitalization	
J.F. Li, Y.W. Bao, S. Han, Y. Qiu and F.Q. Ai	388
Properties Characterization of MgO-Cr₂O₃-ZrO₂ Brick Prepared by Vacuum Impregnation	
W.B. Yang, C. Peng, G.Q. Li, Y.Z. Liu, H.M. Zhang, C.X. Sui and Y. Deng	394
Effects of Sintering Temperature on Phases, Microstructures and Properties of Fused Silica Ceramics	
S.H. Liu, P. Chen, D.H. Xu and Q.D. Yuan	399
Deep Wet Etching Uniformity of Polished Fused Silica Glass	
X.R. Du, X.F. Song, Y.C. Sun, X.Q. Zhang, H. Wang and X.H. Yang	404
Influence of Ionizing Gas Flow on Structural Homogeneity of Type IV Silica Glass	
Y.C. Sun, X.F. Song, X.R. Du, X.Q. Zhang, H. Wang and X.H. Yang	409
Analysis of the Test Method of Quartz Glass Optical Homogeneity	
B. Fu, H. Wang and Z.F. Shao	414
Test and Analysis of Hydroxyl Group in CVD Synthetic Silica Glass	
Y.N. Jia, Y.F. Wang, L.J. Nie, Z.K. Xiang, L. Wang, F.X. Liu and C.D. Rao	419
Flame Temperature Distribution and SiO₂ Particles Distribution in Oxyhydrogen Flame	
L. Wang, H.J. Wang, H. Wang, L.J. Nei, F.X. Lui and X.H. Yang	424
The Effects of Surface Treatments, Compression Speeds and Sample Sizes on Compression Load and Strength of Foam Glass	
C.Y. Zeng, J.C. Zhang, G.H. Zhang, W. Wu, H.B. Guo and Q.Y. Shang	429
Determination of Chemical Composition in Zircon-Refractory Material by MLD Method	
W. Han, Y.B. Liu, J.X. Ren and J.J. Lu	434
Effect of Additives and Carbon Resources on Thermal Shock Resistance of Spinel-C Material	
Z. Wei, G.Q. Liu and J.S. Yang	440
The Improvements for the Siliceous Self-Flow Castable with Adding Nano SiO₂	
L. Shi, H.Z. Gu, S.L. Li and J.J. Zhu	445

Application of Electromagnetic Field Theory in the Study of Iron-Rich Slag Resistance Mechanism of Low Carbon MgO-C Refractories	450
Y. Chai, M.J. Zhang and X.C. Li	
Effects of Matrix Densification Based on Particle Packing on Lightweight Al₂O₃-MgO Castables	455
Y. Zou, H.Z. Gu, A. Huang, M.T. Zhang and M.J. Zhang	
Application of Molten Salt Method in Hercynite Composite Powder Synthesis at Elevated Temperature	460
Y. Chai and M.J. Zhang	
Study of Three-Dimensional Optical Homogeneity of Fused Silica Prepared by Chemical Vapor Deposition	465
Z.F. Shao, Z.K. Xiang, Y.F. Wang, M. Sui and Y.W. Bao	
Preparation and Anisotropic Lattice Thermal Expansion of Hexagonal Cordierite	470
J.H. Zhang, C.M. Ke, H.D. Wu and J.S. Yu	

Chapter 6: Building Materials

Research Progress of Plugging Agent in Construction Engineering	481
L.M. Wang, Z.P. Sun, X. Yang, L.L. Shui, H.J. Yang and W.X. Zhu	
Primal Study on Mechanical Properties of Phosphate Based Geopolymer	490
Z. Ding, C. Lu, P. Cui and W.T. Xu	
Redispersible Polymer Powder-Modified Sulphoaluminate Cement Mortar	495
P. Du, Z.H. Zhou, Z.M. Ye and X. Cheng	
The Restoration of Compressive Strength of Self-Healing Mortar	500
H.N. Geng, N. An, R. Fang and Q. Li	
Water Absorption and Hydration Products of Metakaolin Modified Mortar	505
H.N. Geng and Q. Li	
Preparation and Mechanical Performance of Sulpoaluminate Cement by Using Industrial Solid Wastes	510
S.Z. Zhao, F.L. Han, G.Q. Liu, M.H. Li and Y.J. Chen	
Activity Evaluation of a Tailing in a Cementitious System	515
B.H. Li, L.Z. Xiao and Y.Q. Fu	
Shrinkage Properties of Cement-Silica Fume Blended Pastes in Early Age	521
D. Zou, L.Z. Xiao and W.C. Shi	
Polymer-Modified Cement Waterproofing Coating and Cementitious Capillary Crystalline Waterproofing Materials: Mechanism and Applications	527
Y. Yu and T. Sun	
Study on the Influence of Stone Dust on Adaptability of Polycarboxylate Superplasticizer and Cement	532
Y.C. Jiang, Y. Wang, D. Huo, J.E. Xu and H.C. Yan	
The Effect of Concrete Mix Proportion to the Air Bubble Spacing Coefficients of Hardened Concrete	537
Y. Wang, H.C. Liang, B.C. Zhao and Y.C. Jiang	
The Room Temperature Synthesis and Performance Study of Cationic Polycarboxylate Superplasticizer	542
X.T. Liang, W. Zhang, J.X. Li and Z. Lin	
Experimental Study and Numerical Analysis on Chloride Diffusion Coefficient of Concrete with Various Water-Cement Ratios	547
Z. Ren, L.Z. Xiao and W.C. Shi	
Fracture Properties of Ultra-High Strength Cement-Based Materials	553
Q. Bi and W. Yao	
Study on the Reduction of Radon Exhalation Rates of Concrete with Different Activated Carbon	558
Y.G. Zhang, Y. Wang, C.Y. Yang, G.Q. Li and H.C. Yan	
Identification of Fe-Containing Phase in Oxidation Process of BOF Slag	564
Y.H. Chen, J. Liang, Q.X. Yang and F.L. Han	

Dynamic Hydrothermal Synthesis of Super-Low Density Xonotlite Thermal Insulation Materials from Industrial Quartz Powder	
H.Z. Yue, X. Wang, Z.Z. Yang and C.C. Wei	569
Static Modulus of Ettringite in Different Environment	
P. Chen, Z.Q. Jin and J.F. Fan	576
The Effect of Pore Structure and Water Absorption on Carbonation Resistance of Sulphoaluminate Cement Foam Materials	
D. Zhao, X.N. Li and H.C. Yan	581
Effect of Surface Vitrification on the Properties of Insulation Board of Expanded Perlite	
L.L. Li, W.F. Teng, J.C. Zhang, W. Wu and Q.Y. Shang	586
Test and Optimal Design of New Type Aluminum-Plastic Composite Panel	
C.Z. Zhao, Y. Liu, Q. Jiang and S.W. Ren	591