

Table of Contents

Preface

Zinc Oxide and Semiconductive Materials

(Mg,Zn)O/ZnO Heterostructures Prepared by Pulsed Laser Deposition

Y. Adachi, N. Ohashi, I. Sakaguchi, T. Osawa, H. Ryoken, H. Yoshikawa, S. Ueda, K. Kobayashi and H. Haneda 3

Effect of Annealing on Electrical Degradation Characteristics of ZnO Varistors

M. Takada and S. Yoshikado 7

Study on Recovery of Electrical Degradation of ZnO Varistors

H. Yoshida, M. Takada and S. Yoshikado 11

Electrical Degradation Caused by Electro-Static Discharge Pulse in ZnO-Based Multilayer Varistor

E. Koga and N. Sawada 15

Photoluminescence from ZnO Thin Film Deposited on R-Plane Sapphire Substrate by RF Magnetron Sputtering

S. Tanaka, Y. Ishikawa, T. Suzuki and N. Shibata 19

Impurity Contamination and Diffusion during Annealing in Implanted ZnO

I. Sakaguchi, Y. Adachi, T. Ogaki, K. Matsumoto, S. Hishita, H. Haneda and N. Ohashi 23

Synthesis of Well-Aligned ZnO Nanowhisker Films Using Aqueous Solution for Use in Dye-Sensitized Sensor

X.L. Hu, Y. Masuda, T. Ohji and K. Kato 27

Lithium Batteries and Related Materials

High-Rate Charge-Discharge Performance of Composite Electrodes of FeOOH-Based Amorphous Particles and Carbon Powder

H. Morimoto, K. Takeno, T. Takahashi, K. Hayashi and S. Tobishima 33

Fabrication of Titanate Thin Film by Electrophoretic Deposition of Tetratitanate Nanosheets for Electrodes of Li-Ion Battery

S. Suzuki, N. Sakai and M. Miyayama 37

Effects of Lattice Defects on Cathode Properties of LiMn₂O₄ Synthesized at Low Temperatures for Lithium Ion Secondary Battery

H. Kaiya, S. Suzuki and M. Miyayama 41

High-Power Charge/Discharge Properties of LiFePO₄/Carbon Composites with Various Carbon Materials

A. Kuwahara, S. Suzuki and M. Miyayama 45

Electrode Properties of Ba_{0.5}Sr_{0.5}Co_yFe_{1-y}O_{3-δ} Cathode Materials for Solid Oxide Fuel Cell

S. Asagi, S. Suzuki and M. Miyayama 49

Synthesis and Lithium Ion Conductivity of MP₂O₇-Based Solid Electrolytes

A. Kato, M. Saito and J. Kuwano 53

Shell-Core Type Proton Conducting TiP₂O₇-Based Solid Electrolytes

S. Tanimoto, S. Hirukawa, T. Shirai, S. Sato, T. Kusano, M. Saito, J. Kuwano and H. Shiroishi 57

Classical Molecular Dynamics Simulations on Fast Li Ion Conduction in (Li,La)TiO₃

M. Hirakuri, T. Okumura, M. Saito and J. Kuwano 61

Preparation of Ru Nano-Particles Dispersed on a Highly-Porous Material

K. Aramaki, S. Kawaguchi, M. Saito, J. Kuwano and Y. Saito 65

Defect Control and Lithium-Ion Conducting Properties of Layered Perovskite Oxides Li₂SrTa₂O₇

T. Fukushima, S. Suzuki and M. Miyayama 69

Oxygen Reduction Electrode Properties of Oxide Nanosheet-Based Materials

Y. Akeboshi, N. Ohno, H. Tokuno, M. Saito, J. Kuwano and H. Shiroishi 73

Preparation of High Lithium Ion Conductive Glass-Ceramics Solid Electrolytes in the $\text{LiTi}_2(\text{PO}_4)_3$ System by the Mechanochemical Method and their Application as Coating Materials of LiCoO_2	
H. Morimoto, Y. Someno, Y. Arai and S. Tobishima	77
Electrochemical Properties of Carbon Doped LiFePO_4 Cathode Materials Prepared by Spray Pyrolysis	
K. Egawa, I. Mukoyama, T. Kodera, K. Myoujin and T. Ogihara	81
Mass Production and Battery Properties of $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ Powders Prepared by Internal Combustion Type Spray Pyrolysis	
M. Kojima, I. Mukoyama, K. Myoujin, T. Kodera and T. Ogihara	85
Electrochemical Properties of $\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$ Powders Prepared by Internal Combustion Type Spray Pyrolysis	
T. Kodera, I. Mukoyama, K. Myoujin, T. Tsuzuki, T. Ogihara and M. Uede	89
A Study of Intermediate Temperature Proton-Conductive Phosphate Electrolytes	
K. Sakamoto, H. Shiroishi, T. Shirai, S. Satou, M. Saito and J. Kuwano	93
Ion Exchange of Layer Structured Crystal $\text{K}_x\text{Ti}_{2-x}\text{Fe}_x\text{O}_4$ ($x = 0.80$) and its Application as Cathode Material in a Rechargeable Lithium Battery	
M. Ohashi	97

Nanocrystals and Processing

Influence of Synthesis Condition on N_2 Adsorption Characteristics of Anatase TiO_2 Particles Prepared in an Aqueous Solution	
Y. Masuda and K. Kato	103
Morphology Control of High Luminance Phosphors	
K. Toda, M. Hosoume, K. Sato, K. Uematsu, M. Sato, A. Watanabe and T. Fukui	107
Preparation of Barium Titanate Nanocube Particles by Solvothermal Method and their Characterization	
S. Wada, A. Nozawa, M. Ohno, T. Tsurumi and Y. Kuroiwa	111
Preparation of TiO_2 Thin Films by Electrophoresis Deposition Method in Highly Dispersed Colloidal Solution	
K. Yamamoto, M. Watanabe and S. Yoshikado	115
Ferromagnetic Properties in Co-Substituted Titania Nanosheets	
M. Osada, Y. Ebina, K. Takada and T. Sasaki	119
Fabrication of Electroluminescent Devices Using Nanocrystalline Oxide Phosphors	
R. Fujiwara, H. Sano, S. Harada, M. Shimizu, H. Takebe and M. Kuwabara	123
Three-Dimensional TEM Tomography Analysis of Epitaxially Assembled Perovskite Oxide Nanocrystalline Particles	
N. Iwaji, H. Takebe and M. Kuwabara	127

Thin and Thick Films

Epitaxial Growth of LSMO Film Prepared by Excimer Laser-Assisted Metal Organic Deposition (ELAMOD)	
T. Tsuchiya, K. Daoudi, T. Nakajima and T. Kumagai	133
Ferroelectric and Luminescent Properties of Electroluminescence Devices Using Ferroelectric Polymer-Phosphor Composite Films	
K. Aizawa and Y. Ohtani	137
Patterning of HfO_2 Thin Films Using Chemical Solution and Dielectric Properties	
K. Suzuki and K. Kato	141
Adsorption Property of Dye Molecule over Semi-Crystalline Mesoporous Titania Films	
X.J. Meng, T. Kimura, T. Ohji and K. Kato	145
Crystallization Behavior of $\text{BaO-TiO}_2\text{-GeO}_2$ Glass Thin Film	
R. Ogawa, H. Masai, Y. Takahashi, H. Mori, T. Fujiwara and T. Komatsu	149
Fabrication of Triboluminescent Film on Inconel 600 Substrate by RF Magnetron Sputtering Method	
X.Y. Fu, H. Yamada and C.N. Xu	153

Ferroelectric Thin Films

Fundamental Study on High-Frequency Ultrasound Probes Fabricated by Aerosol Deposition Method and Hydrothermal Method A. Endo, J. Akedo and S. Takeuchi	159
Physical and Electrical Properties of (Ba_{0.6},Sr_{0.4})TiO₃ Ferroelectric Thick Films Prepared by Aerosol Deposition Technique D. Popovici, H. Tsuda, J.H. Park, J. Akedo and M. Okuyama	163
Influence of Hydrogen Atoms on Electrical Properties of BST Thin Film Capacitors K. Morito, T. Suzuki, Y. Mizuno, I. Sakaguchi, N. Ohashi and H. Haneda	167
Effect of Gel-Films-Thickness and Sintering Conditions on the Crystal Structure and Microstructure of Alkoxy-Derived BaTiO₃ Thin Films K. Tanaka, K. Suzuki and K. Kato	171
Effect of the Annealing Temperature on Dielectric Properties of Bi_{1.5}Zn_{1.0}Nb_{1.5}O₇ Films Prepared by MOCVD H. Funakubo, S. Okaura, M. Suzuki, H. Uchida and S. Koda	175
Preparation of Epitaxial LiNbO₃ Thin Film by MOCVD and its Properties R. Morohashi, N. Wakiya, T. Kiguchi, T. Yoshioka, M. Tanaka and K. Shinozaki	179
Analysis of Nonlinear Dielectric Characteristics of (Ba, Sr)TiO₃ Thin Films and their Frequency Conversion Application T. Nishida, T. Nozaka, T. Tsuchikawa, M. Echizen, H. Takeda, K. Uchiyama and T. Shiosaki	183
Preparation of MBi₄Ti₄O₁₅ (M=Ba,Ca) Thick Films by Screen Printing T. Futakuchi, T. Kakuda, Y. Sakai, S. Kakiuchi and M. Adachi	187
Preparation of (Ba, Sr)TiO₃ Thin Films on Glazed Alumina Substrate and Analysis of their Electric Properties T. Nozaka, Y. Mizutani, B. Gun, T. Tsuchikawa, M. Echizen, T. Nishida, H. Takeda, K. Uchiyama and T. Shiosaki	191
Laser-Anneal of Metal-Based Micro Optical Scanner Derived by Aerosol Deposition S. Baba, J.H. Park, H. Sato, S. Nakano, K. Ashida and J. Akedo	195

Ferroelectric and Piezoelectric Ceramics

Changes in the Electrical Conduction Mechanism with the Electrical Degradation of BaTiO₃-Based Ceramics M. Nakano, A. Saito and N. Wada	201
Grain-Orientation Control of Bi₅FeTi₃O₁₅ Ceramics Prepared by Magnetic-Field-Assisted Electrophoretic Deposition Method M. Suzuki, T. Uchikoshi, Y. Noguchi and M. Miyayama	205
Effect of Template Particle Formation on Texture Development in Bi_{0.5}Na_{0.5}TiO₃ Ceramics T. Kimura and T. Motohashi	209
Growth Condition and Ferroelectric Property of Mn-Doped Na_{0.5}K_{0.5}NbO₃ Crystal Y. Inagaki, K. Kakimoto and H. Ohsato	213
Dielectric Property of Poly- and Single-Crystalline BaTi₂O₅ Co-Substituted with SrO and ZrO₂ X.Y. Yue, R. Tu and T. Goto	217
Preparation of Transparent SBN Ceramics and their Opto-Electrical Properties T. Kubota, N. Tanaka, K. Kageyama, H. Takagi and Y. Sakabe	221
Dielectric Properties in the Insoluble Compositions of BaTiO₃-CaTiO₃ Ceramics K. Banno, T. Koga, T. Takeda, H. Sano, T. Morimoto and H. Takagi	225
Fabrication and Electrical Properties of (Bi_{1/2}Na_{1/2})TiO₃-BiAlO₃ Ferroelectric Ceramics Y. Watanabe, Y. Hiruma, H. Nagata and T. Takenaka	229
Piezoelectric Properties and Depolarization Temperature of NaNbO₃-LiNbO₃ Lead-Free Piezoelectric Ceramics R. Aoyagi, M. Iwata and M. Maeda	233
Crystal Growth and Ferroelectric Properties of Superlattice-Structured Bi₄Ti₃O₁₂-PbBi₄Ti₄O₁₅ Single Crystals M. Ikezaki, Y. Noguchi, K. Katayama and M. Miyayama	237

Crystal Growth and Ferroelectric Properties in $\text{Bi}_{0.5}\text{Na}_{0.5}\text{TiO}_3\text{--BaTiO}_3$ Crystals S. Teranishi, Y. Noguchi and M. Miyayama	241
Sintering and Dielectric Properties of $\text{Ba}(\text{Mg}_{1/3}\text{Ta}_{2/3})\text{O}_3$ Particle Prepared by Spray Pyrolysis H. Yamada, T. Okawa and T. Ogihara	245
Microwave Dielectrics and Related Materials	
Microstructures and Microwave Dielectric Properties on Annealed $\text{Al}_2\text{O}_3\text{--TiO}_2$ Composite Ceramics Y. Miyauchi, I. Kagomiya, Y. Shimizu and H. Ohsato	251
Ceramic Processing and Characterization	
Design of Composite Electromagnetic Wave Absorber Made of Soft Magnetic Materials Dispersed and Isolated in Polystyrene Resin K. Sakai, Y. Wada and S. Yoshikado	257
Temperature Dependence of Cathodoluminescence for AlN Ceramics Sintered with $\text{Ca}_3\text{Al}_2\text{O}_6$ T. Honma, Y. Kuroki, T. Okamoto, M. Takata, Y. Kanechika, M. Azuma and H. Taniguchi	261
Dynamic Visualization of Stress Distribution by Mechanoluminescence Image C.S. Li, C.N. Xu, L. Zhang, H. Yamada, Y. Imai and W.X. Wang	265
Molecular Dynamics Study of Oxygen Vacancy Diffusion in BaTiO_3 Doped with Rare Earth Ions T. Oyama, N. Wada and Y. Sakabe	269
Microstructure Study of BaTiO_3 Ceramics Using Convergent Beam Electron Diffraction K. Kobayashi, T. Suzuki and Y. Mizuno	273
A Novel Blue-Violet Emitting Mechanoluminescent Material with Calcium Aluminosilicate L. Zhang, C.S. Li, H. Yamada and C.N. Xu	277
Synthesis of $\text{Ba}_{1-x}\text{Sr}_x\text{TiO}_3$ Powders by KOH-KNO_3 Molten Salt Method T. Kishiki, M. Higuchi, T. Asaka, Y. Azuma and K. Katayama	281
Effect of Pore Structures on the Humidity Sensitivity of TiO_2-Based Ceramic Humidity Sensors H. Aoki, T. Asaka, M. Higuchi, Y. Azuma, K. Asaga and K. Katayama	285
Preparation and Exchange Bias of a $\text{Cr}_2\text{O}_3/(\text{La}_{0.7}\text{Sr}_{0.3})\text{MnO}_3$ Magnetic Hetero Junction T. Yokota, T. Kuribayashi, S. Murata and M. Gomi	289
Dye-Sensitized Solar Cell Fabrication with Hydrothermal Synthesized TiO_2 and Evaluation the Power Generation Efficiency T. Nakamura, H. Horikawa, M. Asahara, X.Z. Wu and T. Ogihara	293
Basic Research of Water Photolysis Using Pyrochlore Oxides N. Mori, Y. Tagoku, H. Shiroishi, Y. Saito, M. Saito and J. Kuwano	297
Enhancement of Mechanoluminescence from ZnS:Mn,Te by Wet Process T. Toriyi, Y. Adachi, H. Yamada, Y. Imai and C.N. Xu	301
New Mechanoluminescent Materials with Various Colors H.W. Zhang, H. Yamada, N. Terasaki and C.N. Xu	305