

10th INTERNATIONAL CERAMICS CONGRESS

Part D

TABLE OF CONTENTS

SECTION J - CERAMICS FOR ELECTROCHEMICAL, CHEMICAL, NUCLEAR AND ENVIRONMENTAL APPLICATIONS

J-1 Ceramics in Chemical and Biochemical Sensors

Potentiometric CO ₂ gas sensor with lithium ion conducting electrolytes C.-H. Lee, S. Akbar, C.-O. Park	3
Novel electrochemical cells as gas sensors R.V. Kumar	15
Non-ideal response of semiconducting oxide gas sensors A. Atkinson	27
Investigations on the electronic conduction properties of potassium beta alumina K. Shqau, H. Näfe, F. Aldinger	35

J-2 Ceramics in Electrochemical Energy Conversion and Storage

Present status of ceramic fuel cells S.C. Singhal	45
Variety of fuels for intermediate temperature solid oxide fuel cells using LaGaO ₃ based oxide T. Ishihara, S. Wang, Y. Tsuruta, H. Nishiguchi, Y. Takita	57
Effect of water on electrochemical characteristics of oxides for high temperature electrochemical devices N. Sakai, K. Yamaji, T. Horita, Y.P. Xiong, H. Yokokawa	69
Evaluations on the thermal expansion properties of the SOFC component materials S. Yoneda, Y. Ohno	77

Development of ceramic electrodes for electrochemical capacitors L. Plomp, F.H. Van Heuveln	85
Local crystal structure of Sc ₂ O ₃ -doped ZrO ₂ at high temperature Y. Arachi, T. Asai	95
La _{0.8} Sr _{0.2} MnO ₃ powder synthesis by a drop pyrolysis in a fluidized bed N. Nakagawa, K.-I. Kato, K. Niki, T. Shirai	103
New cathode material of VOPO ₄ for Li ion rechargeable battery T. Ishihara, B.M. Azmi, H. Nishiguchi, Y. Takita	111
Preparation of LiFePO ₄ /metallic (Ni, Cu, and Ag) nanocomposites for electro- chemical applications by complex sol-gel process A. Deptula, T. Olczak, W. Lada, B. Sartowska, A.G. Chmielewski, J. Hassoun	119

J-3 Ceramics in Nuclear Fusion and Fission

J-3.1 Fusion Reactor Materials and Components

Silicon carbide composites for fusion reactor application L.L. Snead, T. Inoki, Y. Katoh, T. Taguchi, R.H. Jones, A. Kohyama, N. Igawa	129
Joining of ceramic matrix composites for fusion application M. Ferraris, P. Appendino, V. Casalegno, F. Smeacetto, M. Salvo	141
Synthesis of lithium aluminate by thermal decomposition of lithium dawsonite J. Jiménez-Becerril, S. Sugita, C.A. Contreras	153
Development of fabrication technology for lithium ceramics, models of tritium breeding zones with the materials and nuclear reactor tests of ones in Russia V.K. Kapychev, V.N. Tebus, V. Frolov	158

J-3.2 Fission Reactor Materials and Components

Behavior of functional ceramics under fission reactor irradiation T. Shikama	169
Ceramic corrosion protection systems for zircaloy cladding R. Baney, J.Tulenko, R. Singh, G. Fuchs, D. Butt, P. Demkowicz, G. Schoessow, S. Park, J. Kim, Y. Al-Olayyan, S. Bang	181
Plane wave pseudopotential study of point defects in uranium dioxide M. Freyss, J.-P. Crocombette, T. Petit, F. Jollet	191

J-3.3 Ceramics in Radioactive Waste Management

Immobilization of tetravalent actinides in the TPD structure N. Dacheux, N. Clavier, P. Le Coustumer, R. Podor	201
Study of TPD-Monazite systems as a ceramic for the nuclear waste storage N. Clavier, N. Dacheux, O. Terra, P. Le Coustumer, R. Podor	209
Phases with $\text{CaKd}(\text{PO}_4)_2$ structure as cesium host L. Campayo, F. Audubert, J.-E. Lartigue, D. Bernache-Assollant	217
A ceramic of interest for the future in the nuclear industry: solid solutions of tetravalent actinide dioxide G. Heisbourg, N. Dacheux, C. Fauvel, S. Hubert	225
A ceramic wasteform for the immobilization of chloride-containing radioactive wastes I.W. Donald, B.L. Metcalfe, R.D. Scheele, D.M. Strachan	233
High temperature thermal properties of $\text{Nd}_2\text{Zr}_2\text{O}_7$ pyrochlore S. Lutique, R.J.M. Konings, V.V. Rondinella, J. Somers, T. Wiss	241

J-4 Ceramic Membranes and Filters

Perovskite-type oxide capillaries for oxygen permeation J. Luyten, A. Buekenhoudt, F.M.M. Snijkers	249
Novel synthesis of ceramic membranes H. Verweij	259
Ceramic membranes for air purification A. Larbot, E. Prouzet, M. Bertrand, S. Marre	273
Fabrication and microstructure of SrTiO_3 composite membranes by the sol-gel process D.-S. Bae, S.-W. Kim, K.-S. Han	279
Coating and intergrowth of NaX molecular sieve films on porous ceramics for membranes I.J. Kim, D.N. Seo, H.J. Lee, H.C. Kim, H.M. Lim, G. Grathwhol	287
Metals removal from wastewater by filtration through expanded clay Leca [®] beds J.M. Ventura, J.A. Labrincha, M.J. Ribeiro, K. Rosenbom	293
Strength degradation of silicon carbide hot gas filter K.S. Lee, S.H. Lee, D.W. Seo, I.S. Han, Y.O. Park, S.K. Woo	301

J-5 Catalysts and Catalysts Supports

Ceramic structures as supports for natural gas combustion D. Trimis	311
Structural and adsorption characteristics of sol-gel Pd/TiO ₂ catalysts for no reduction with methane J.M. Watson, U.S. Ozkan	323
Diesel exhaust treatment via catalytic ceramic traps G. Saracco, D. Fino	335
Transition/non-transition-aluminogallate spinels as a selective catalysts for the reduction of nitric oxide with hydrocarbon under oxygen-rich condition Md.H. Zahir, K. Matsuda, S. Katayama, M. Awano	347
In situ perovskites catalyst synthesis and deposition on ceramic supports P. Fino, D. Fino, N. Russo, S. Palmaro, G. Saracco, V. Specchia, C. Badini	355
Ceramics as immobilization supports of enzymes and biomaterials and their applications A.C. Pierre	363
Decomposition of nitric oxide over barium loaded catalysts S. Iwamoto, T. Yasuda, Y. Kouno, M. Inoue	375
Structural and catalytic properties of iron oxides prepared by NaOH and FeSO ₄ solution M. Orihara, W.B. Li, K. Nakagawa, T. Moriga, S. Sugiyama, I. Nakabayashi	381
Photocatalytic effects of rutile phase TiO ₂ ultrafine powder with high specific surface area D.-H. Cho, S.-K. Ku, S.-J. Kim	387
Effect of preparation methods and conditions on nanocrystalline anatase properties T. Todorov, J. Carda, E. Cordoncillo, F. Fabregat, I. Morasero, H. Beltran, V. Kozhukharov	395
Preparation of wire-mesh honeycomb coated with alumina-encapsulated aluminum layer K.S. Yang, Z.D. Jiang, J.S. Chung	403

J-6 Nano-Materials for Electrochemistry

Covalent monolayers on conducting carbon substrates: a new paradigm for molecular electronics R.L. McCreery	413
---	-----

Investigations of ceramic photoelectrodes from Fe ₂ O ₃ doped with niobium V.M. Aroutiounian, V.M. Arakelyan, G.E. Shahnazaryan, G.M. Spepanyan, J.A. Turner, O. Khaselev	425
---	-----

SECTION K - ELECTRICAL, MAGNETIC AND OPTICAL CERAMICS

K-1 Dielectrics and microwave materials

High T _c superconductor thin films for microwave applications: frequency agile filters based on SrTiO ₃ /YBa ₂ Cu ₃ O ₇ heterostructures J.-P. Contour, K. Bouzehouane, E. Jacquet, Y. Lemaître, J.-C. Mage, D. Mansart, B. Marcilhac, F. Pailloux	437
Effect of bond valence on microwave dielectric properties of (Pb _{1-x} Ca _x)[Fe _{0.5} (Nb _{1-y} Ta _{y/0.5}) _{0.5}]O ₃ ceramics K.H. Yoon, H.S. Park, J.Y. Cho, E.S. Kim	451
Materials design and development of microwave dielectrics based on crystal structure H. Ohsato	463
Influence of powder quality on the dielectric properties of BaTiO ₃ ceramics and thick films for power integration S. Guillemet-Fritsch, A. Ianculescu, C. Calmet, J. Sarrias, B. Durand, T. Lebey	475
Effect of the microstructure on dielectric properties in BaTiO ₃ based ceramics for Ni-MLC H. Kishi, Y. Mizuno, H. Chazono	483
Dielectric properties of (Pb _{1-x} Ca _x)(Fe _{0.5} Ta _{0.5})O ₃ ceramics at microwave frequencies E.S. Kim, H.S. Park, K.H. Yoon	495
Development of cryogenically microwave lossy ceramics with adjustable properties B. Mikijelj, I. Campisi	507
Processing and effect of dopants on the formation and microwave properties of Nd ₂ Ti ₃ O _{9.8} dielectric ceramics H.-W. Wang, T.-W. Cheng, W.-S. Lin	515
EM-wave absorption of wood-based C-C composite material T. Kikuchi, M. Miki, M. Nakamura, K. Hatakeyama, M. Nakanishi, J. Takada	523
Microwave dielectric ceramics in the system BaTiO ₃ -La ₂ O ₃ (Nd ₂ O ₃) D. Kukla, A. Olszyna, J.K. Piotrowski	531

Microwave absorption ceramics I. Fesenko, N. Novikov, T. Prikhna, V. Chasnyk	539
Capabilities of quartz ceramics A.G. Romashin, M.Yu. Rusin, F.Ya. Borodai	545
A new Y5V-BME material prepared by mixed oxide technology G. Koebrugge, K. Albertsen, I. Hayashi, B. Derks	553
The characteristics of ZrO ₂ thin films as gate dielectrics J.-H. Yoo, S.-W. Nam, S. Nam, S.-K. Kang, D.-H. Ko	561
A study of the microstructure and electrical properties of the reoxidized HfO ₂ thin film on Si(100) deposited by DC magnetron sputtering system D. Lee, J.-H. Yoo, S.-W. Nam, S. Nam, D.-H. Ko	569

K-2 Varistors

Evaluation of single grain boundary in ZnO:Pr varistors K. Mukae, K. Tsuda, T. Nagata, A. Ohi, A. Tanaka	579
Effects of aluminium on the upturn region of the current-voltage characteristic of ZnO-based ceramics M. Houabes, S. Bernik, C. Talhi, A. Bui	589
Extrusion of ultra-small BaTiO ₃ PTCR elements M. Wegmann, A. Hendry, F. Clemens, T. Graule	597

K-3 Ferroelectrics

Domain behavior by electric fields in ferroelectric ceramics and single crystals T. Ogawa	607
Fatigue-free Pb(Zr,Ti)O ₃ (PZT)-based film capacitors for nonvolatile ferroelectric random access memories H.M. Jang	615
Structure and phase transitions in Aurivillius phase ferroelectrics P. Lightfoot, C.H. Hervoches	623
Homoepitaxial template grain growth of textured Pb(Mg _{1/3} Nb _{1/3})O ₃ -PbTiO ₃ [PMN-PT] ceramics M. Pham Thi, H. Hemery	631
Polarized Raman scattering and "soft" phonon modes of epitaxial Pb(Zr,Ti)O ₃ (PZT) thin films S.-H. Lee, H. Yi, H.H. Sung, H.M. Jang	641

Ferroelectricity of $\text{Pb}(\text{Zr}_{0.5}\text{Ti}_{0.5})\text{O}_3$ fine particles synthesized by sol-gel method Z. Surowiak, K. Osinska, M. Plonska, D. Czekaj	649
Effect of the sintering conditions on the dielectric characteristics of $0.97\text{BaTiO}_3 - 0.03\text{PbF}_2 - 0.03\text{LiF}$ ceramics L. Taïbi-Benziada	657
Preparation and electrical properties of sintered bodies composed of monophase spinel $\text{Mn}_{1.5}\text{Co}_{(0.25+X)}\text{Ni}_{(1.25-X)}\text{O}_4$ ($0 \leq X \leq 1$) derived from rock-salt-type oxides T. Meguro, T. Yokoyama, Y. Shimada, J. Tatami, K. Komeya, N. Hotta, T. Sasamoto	665

K-4 Piezoelectrics and Electrostrictives

Nanoscale control and domain wall dynamics in epitaxial ferroelectric $\text{Pb}(\text{Zr}_{0.2}\text{Ti}_{0.8})\text{O}_3$ thin films P. Paruch, T. Tybell, J.-M. Triscone	675
Numerical modeling of hysteretic behavior of piezomaterials under high external solicitations G. Sebald, E. Boucher, D. Guyomar	687
Effects of Zr/Ti ratio on structural and electrical properties of (Mn,F) Co-doped PBSZT ceramics E. Boucher, B. Guiffard, L. Lebrun, D. Guyomar	695
Effect of thermal compressive stress on 1-3 piezoelectric composite power transducer H.-S. Lee, C. Richard, D. Guyomar	703
Fabrication of composite ceramics composed of single crystals and powder using a hybrid sintering process H. Takahashi, S. Tsukamoto, J. Qiu, J. Tani	711
Preparation of structured PZT ceramics G. Teschmit, G. Tomandl	718
Structural and piezoelectric properties of sintered PZT ceramics prepared by nonconventional mechanical activation process C. Miclea, C. Tanasoiu, A. Gheorghiu, C.F. Miclea, V. Tanasoiu	727

K-5 Ionic Conductors

Crystal structure of new fast oxide-ion conductor $\text{La}_2\text{Mo}_2\text{O}_9$ P. Lacorre, F. Goutenoire, F. Altorfer, D. Sheptyakov, F. Fauth, E. Suard	737
---	-----

Conductivity and lattice effects in $\text{Li}_{3x}\text{La}_{2/3-x}\text{TiO}_3$ fast ionic conductors A. Rivera, C. León, J. Santamaría, A. Várez, J. Sanz	749
Effect of yttrium niobate on the electrical conductivity of yttria-stabilized zirconia C. Chang, S. Jou	761

K-6 Magnetic Ceramics

Fabrication of nano-size hexagonal ferrite / Pt multilayers using facing targets sputtering S. Nakagawa	771
Relevant magnetovolume effects in mixed valent manganites P.A. Algarabel, M.R. Ibarra, J.M. De Teresa, C. Marquina, B. Garcia-Landa, L. Morellon, A. Del Moral	783
High frequency transport properties on spin-spray plating Ni-Zn ferrite thin film C.M. Fu, H.S. Hsu, N. Matsushita, C.P. Chong, M. Abe	795
Study on the characterization of electrical properties and structures for phase transition of magnetite Y.-K. Byeun, S.-C. Choi	803
Magnetic properties and microstructure of manganese zinc ferrites K. Yasuhara, A. Nakano, T. Nomura	809
Cation-substitution and vacancies studies in spinel structure of ferrite and their effects on magnetic properties M. Alavi, K. Movassaghi, J. Schoonman	817
Preparation of YIG by mechanical alloying M. Mozaffari, J. Amighian	823
Magnetic properties of crystal-oriented magnetoplumbite ferrite by using a hot-forging technique O. Kimura, Y. Murakami, M. Matsumoto, M. Sakakura, K. Shoji	827
Permeability spectra in (Ba, Co)-Z hexa-ferrite T. Nakamura, E. Hankui	835
Magnetic properties of $\text{Y}(\text{Co},\text{Mn})\text{O}_3$ solid solution with perovskite-type structure D. Gutiérrez, O. Peña, P. Durán, C. Moure	843

K-7 Optical, Electro-Optical and Magneto-Optical Materials and Devices

Inorganic phosphors for new LED types W. Rossner, U. Liepold	853
---	-----

CVR-SiC for high performance optical applications W. Kowbel, C. Bruce, R. Woida, J.C. Withers	865
Influence of Li vacancy flow on Ti in-diffusion in lithium niobate M. Tsirlin, N. Navi, A. Greenblatt, M. Dariel	877
Electrical magnetic and optical properties of melt growth ceramic composites V.M. Orera, J.I. Peña, R.I. Merino, A. Larrea, G.F. de la Fuente	885
Growth kinetics of tellurite glasses doped with PbTe quantum dots G.J. Jacob, C.L. Cesar, L.C. Barbosa	897
PbTe and HgTe deposited on glass substrate by laser ablation M.F.L. Cesar, E.R. Gonzalez, C.L. Cesar, L.C. Barbosa	903
Structure and electronic properties of LiNbO ₃ -Mo _x systems (M=Zn, Al, Ti...) T. Shirakami, Y. Yamamoto, S. Kodama, Y. Nishizawa, Y. Seki, D. Seki, K. Urabe	911
Phase transformations in titania-containing magnesium aluminosilicate glass-ceramics for diffuse reflectors A.V. Bortkevich, O.S. Dymshits, A.Yu. Polushkin, A.V. Shashkin, M.Ya. Tsenter, A.A. Zhilin, W.-B. Byun	919
Nanosized glass-ceramics doped with CoO: nonlinear spectroscopy and possible laser applications O.S. Dymshits, A.A. Zhilin, A.V. Shashkin, A.M. Malyarevich, I.A. Denisov, Y.V. Volk, K.V. Yumashev, U. Kang, K.-H. Lee	927

K-8 Integrated Electronics, Optics, Opto-Electronics and Magneto-Optics

Dry etching process and ferroelectric properties of PZT thin films S.-Y. Chen, Y.-C. Lu, J.-Y. Yang	937
Application of negative thermal expansion to optical fibres L.J. Vandeperre, A. Howlett, W.J. Clegg	945
The effect of bottom electrode on the ferroelectric property of RF- magnetron-sputtered BaTiO ₃ thin films Y.W. Cho, S.K. Choi, J.H. Kim, W.K. Choo	953

K-9 Adaptive Ceramics, Sensors and Actuators

Piezoelectric transformers - New perspectives - K. Uchino, B. Koc, P. Laoratanakul, A. Vázquez Carazo	961
Hydrothermally deposited PZT thin film transducers for sensors and actuators T. Kanda, M.K. Kurosawa, Y. Kobayashi, T. Igi, M. Sasaki, T. Higuchi	973

K-10 Transparent Conducting Oxides

Frontier of transparent conductive oxides H. Ohta, M. Orita, H. Hiramatsu, K. Nomura, M. Miyakawa, K. Ueda, M. Hirano, H. Hosono	983
First-principles electronic structure calculations of transparent conducting oxides A.J. Freeman, R. Asahi, O.N. Myrasov	995
Combinatorial approaches to discovery and optimization of transparent conducting oxides in the ZnSnOx system D. Ginley, C. Warmsingh, J. Del Cueto, M. Van Hest, L. Gedvilas, B. Keyes, B. To, X. Li, D. Readey, J. Perkins	1009
Defect chemistry and transport of transparent conductors in the CdO-In ₂ O ₃ -SnO ₂ system T.O. Mason, G.B. Gonzalez, D.R. Kammler, N. Mansourian-Hadavi, B.J. Ingram	1021
Wide-gap <i>p</i> -type Cu(I)-containing layered oxychalcogenides K. Ueda, H. Hosono, H. Hiramatsu, M. Orita, M. Hirano, H. Kawazoe	1029
Technological challenges for transparent conductors R.G. Gordon	1037
Transparent conducting amorphous oxides in zinc oxide-indium oxide system T. Moriga, S. Hosokawa, T. Sakamoto, A. Fukushima, K. Murai, I. Nakabayashi, K. Tominaga	1051
An overview of research into transparent conducting oxides at NREL T.J. Coutts, X. Li, D.S. Ginley, D.L. Young, J.D. Perkins, S.-H. Wei, X. Nie, S.B. Zhang	1061
<i>p</i> -type transparent conductors D.Y. Shahriari, A. Ambrosini, A. Barnabé, A. Wahl, K.R. Poeppelmeier	1073
Influence of the spray pyrolysis conditions in the physical and chemical properties of thin films of ZnO-Al R. Ayouchi, D. Leinen, F. Martín, M. Gabas, J.R. Ramos-Barrado	1085
New technologies in fabrication of ITO thin films: microstructure and processing Y. Shigesato	1093
Characterization of thin films of SnO ₂ -F prepared by spray pyrolysis M. Sánchez, D. Leinen, F. Martín, M. Gabas, J.R. Ramos-Barrado, J. Morales, L. Sánchez	1105
AUTHOR INDEX	1113