

Table of Contents

Preface and Committees

Chapter 1: Smart Inorganic Materials Systems

Integrated Piezoelectrics for Smart Microsystems - A Teamwork of Substrate and Piezo S. Gebhardt, D. Ernst, B. Bramlage, M. Flössel and A. Schönecker	1
Modeling of 3D Magnetostrictive Systems with Application to Galfenol and Terfenol-D Actuators M.J. Dapino and S. Chakrabarti	11
Impact of Sputter Deposition Parameters on the Leakage Current Behavior of Aluminum Nitride Thin Films M. Schneider, T. Strunz, A. Bittner and U. Schmid	29
Dielectric Properties of $\text{Ba}_{1-x}\text{La}_x\text{Ti}_{1-x/4}\text{O}_3$ Ceramics with Different La^{3+} Content B. Wodecka-Dus, M. Adamczyk, K. Osinska, M. Plonska and D. Czekaj	35
Multilayer Ceramic Capacitors Based on the PMN-PT-PFN Solid Solution R. Skulski, P. Wawrzala, D. Bochenek, J. Kulawik, D. Szwagierczak and P. Niemiec	41
Ceramics PMN-PT-PFN for Multilayer Capacitors D. Bochenek, R. Skulski, P. Wawrzala and P. Niemiec	47
Comparison of the Long-Term Stability of TiO_2 Hydrosols with Different Concentration of Nanoparticles O. Pavlova-Verevkin, N. Golubko, A. Sumbatov and L. Ozerina	53
Study on the Fabrication of Visible Light Response Type N-Doped TiO_2 Photocatalyst by SPS N. Kikuchi and T. Asaoka	59

Chapter 2: Stimuli Responsive Polymers and Gels

Recent Progress in Disposable Ion-Selective Sensors for Environmental Applications G. Matzeu, C. Zuliani and D. Diamond	65
Hydrogel Sensors for Process Monitoring M. Windisch and T. Junghans	71
Calix[4]Arenes Appended with Thioamide Moieties as Powerful Tool for Heavy Metals Recognition J. Kulesza, S. Alves Júnior, M. Guziński, M. Bocheńska, V. Hubscher-Bruder and F. Arnaud-Neu	77
Enhanced Piezoelectric Properties of Electrospun Poly(vinylidene fluoride)/ Multiwalled Carbon Nanotube Composites Y.J. Ahn, J.Y. Im, Y.S. Seo and S.M. Hong	82
Novel Adaptive Damping Systems Based on Magnetorheological Fluids H. Böse and J. Ehrlich	86
A Model Reference Adaptive Control of a Magnetorheological Fluid Brake R. Russo and M. Terzo	96
Modeling and Analysis of the Electrorheological Fluids (Suspension Flow) with Aligned-Structure Reformation Y.W. Seo, H.J. Choi and Y.S. Seo	103

Chapter 3: Luminescent and Chromogenic Materials Systems

Chromogenic Windows C.G. Granqvist	108
Tristriazolotriazines with π-Conjugated Segments: Star-Shaped Fluorophors and Discotic Liquid Crystals S. Glang, D. Borchmann, T. Rieth and H. Detert	118
Thermotropic Materials for Adaptive Solar Control R. Ruhmann, A. Seeboth, O. Muehling and D. Loetzsch	124

Synthesis, Characterization and Luminescent Properties of New Coordination Polymers Based on <i>p</i>-tert-Butylcalix[4]Arene-Tetracarboxylic Acid and Lanthanide Cations B. Silva Barros, C.A.F. de Oliveira, J. Kulesza, S. Alves Júnior and M. Bocheńska	132
---	-----

Chapter 4: Multifunctional Composites and Porous Materials Systems

Poly(vinylidene fluoride) Interleaves for Multifunctional Fiber Reinforced Composites G.J. Ehlert, H.X. Tang, N.R. Meeks and H.A. Sodano	138
Superhard TiB₂ - Based Composites with Different Matrix Fabricated from Elemental Powders by SHS-p-HIP M. Ziemnicka-Sylwester	146
Optimization of a Pyrolysis Procedure for Obtaining SiC-SiC_f CMC by PIP for Thermostructural Applications C. Mingazzini, A. Brentari, F. Burgio, E. Buresi, M. Scafè, L. Pilloni, D. Caretti and D. Nanni	153
Magnetoactive Superhydrophobic Foams for Oil-Water Separation P. Calcagnile, D. Fragouli, I.S. Bayer, G.C. Anyfantis and A. Athanassiou	159
Highly Porous Polymeric Foam of Maleimide-Terminated Poly(arylene ether sulfone) Oligomers via High Internal Phase Emulsions K. Thanamongkolit, P. Pakeyangkoon, P. Malakul and M. Nithitanakul	165
Surface Modification of High Internal Phase Emulsion Foam as a Scaffold for Tissue Engineering Application via Atmospheric Pressure Plasma Treatment P. Pakeyangkoon, R. Magaraphan, P. Malakul and M. Nithitanakul	172
Characterization of Ti-27Nb-13Zr Alloy Produced by Powder Metallurgy M.W.D. Mendes, A.H.A. Bressiani and J.C. Bressiani	178
Influence of Hydrochloric Acid Concentrations on the Formation of AgCl-Doped Iron Oxide-Silica Coreshell Structures N. Mahmed, O. Heczko and S.P. Hannula	184
Lectinhistochemistry Evaluation of Bone after Implantation with Macroporous Titanium Samples K.B. Violin, T.S. Goia, J.C. Bressiani and A.H.d.A. Bressiani	190

Chapter 5: Non-Volatile Memory Devices

Inorganic Nanoparticles for either Charge Storage or Memristance Modulation D. Tsoukalas and E. Verrelli	196
Memory Effect of a Different Materials as Charge Storage Elements for Memory Applications I. Salaoru and S. Paul	205

Chapter 6: Multiferroics

Multi-Component Oxide Thin Films and Heterostructures for Electronics: Growth Principles K. Endo, N. Ikenaga and P. Badica	209
Magnetoelectric Properties in Nickel Ferrite – Niobate Relaxor Bulk Composites P. Guzdek	215
Magnetic Properties of the Bi₇Fe₃Ti₃O₂₁ Aurivillius Phase Doped with Samarium M.M. Bučko, J. Polnar, J. Lis, J. Przewoźnik, K. Gąska and C. Kapusta	220
Reflection of Electromagnetic Waves from Multiferroic TbMnO₃ I.V. Bychkov, D.A. Kuzmin, S.J. Lamekhov, L.N. Butko and V.G. Shavrov	225

Chapter 7: Metamaterials

Design and Optimization of Microwave Triangular Meta-Material Resonators in Coplanar Configuration R. Marcelli, E. Proietti, G. Bartolucci, A. Lucibello, G. de Angelis, G. Muzi and J. Solymosi	231
Controlling Electromagnetic Wave Based on Magnetic Metamaterials S.Y. Liu, Z.F. Lin and S.T. Chui	237
Nonlinear Backward-Wave Photonic Metamaterials A.K. Popov, M.I. Shalaev, V.V. Slabko, S.A. Myslivets and I.S. Nefedov	246

Method of CRLH Antenna Impedance Measurement by Means of On-Wafer Characterization Equipment	
G.I. Sajin, I.A. Mocanu and M.A. Voicu	253

Chapter 8: Graphene

<i>In Situ</i> CCVD Grown Graphene Transistors with Ultra-High On/Off-Current Ratio in Silicon CMOS Compatible Processing	
P.J. Wessely, F. Wessely, E. Birinci, B. Riedinger and U. Schwalke	258
Two Dimensional Graphene/h-BCN Based Devices with Large Ion/Ioff Ratio for Digital Applications	
G. Fiori, S. Bruzzone and G. Iannaccone	266
Dielectric-Tuned Diamondlike Carbon Materials for an Ultrahigh-Speed Self-Aligned Graphene Channel Field Effect Transistor	
S. Takabayashi, M. Yang, S. Ogawa, Y. Takakuwa, T. Suemitsu and T. Otsuji	270
Breakdown of the Quantum Hall Regime in a ‘Confined’ Graphene	
Y. Morita	276

Chapter 9: Multifunctional Materials for Energy Harvesting

Cobalt Doped ZnO Nanorods Fabricated by Chemical Bath Deposition Technique	
P. Hari, J. Seay, K. Farmer and K. Roberts	280
Thermoelectric Generating Properties of Aurivillius Compounds	
H. Kohri and T. Yagasaki	285
The Synthesis of In-Se by Vapor Transport Method	
N. Takano, H. Kohri and T. Yagasaki	291
Hybrid Photovoltaic-Piezoelectric Flexible Device for Energy Harvesting from Nature	
D. Vatansever, R.L. Hadimani, T. Shah and E. Siores	297
Phoretic Deposition of Graphene on Manganese-Cobalt Oxide Composites for Supercapacitor Electrodes	
D.H. Gutierrez, J. Lake, C. Javier, A. Cheng, Z. Tanaka, N.J. Londoño and B. Chen	302

Chapter 10: Actively Moving Polymers

Multiple Shape-Memory Behavior of Polyethylene/Polycyclooctene Blends Cross-Linked by Electron Irradiation	
H.J. Radusch, I. Kolesov, U. Gohs and G. Heinrich	307
Tailored One-Way and Two-Way Shape Memory Response of Poly(ϵ-Caprolactone)-Based Systems for Biomedical Applications	
S. Pandini, S. Passera, T. Riccò, A. Borboni, I. Bodini, D. Vetturi, L. Dassa, D. Cambiaghi, K. Paderni, M. Degli Esposti, M. Toselli, F. Pilati and M. Messori	313
Modeling of Shape-Memory Recovery in Crosslinked Semicrystalline Polymers	
I. Kolesov, O. Dolynchuk and H.J. Radusch	319
Photoresponsive Liquid Crystalline Polymeric Materials	
D.Q. Liu, C. Van Oosten, C.W.M. Bastiaansen and D.J. Broer	325
pH-Responsive Hyperbranched Copolymers from One-Pot RAFT Copolymerization of Propylacrylic Acid and Poly(ethylene glycol diacrylate)	
H.Y. Tai, C.L. Duvall, P.S. Stayton, A.S. Hoffman and W.X. Wang	333
Magnetic Field Induced Formation of Magnetic Wires into Thin Elastic Membranes with Controlled Properties	
D. Lorenzo, D. Fragouli, G.C. Anyfantis, R. Cingolani and A. Athanassiou	343
Soft Microorigami: Stimuli-Responsive Self-Folding Polymer Films	
L. Ionov, S. Zakharchenko and G. Stoychev	348
Ethanol Induced Shape Recovery and Swelling in Poly(methyl methacrylate) and Applications in Fabrication of Microlens Array	
Y. Zhao, C.C. Wang, W.M. Huang and H. Purnawali	354