

Table of Contents

Preface, Committees, Sponsors

Chapter 1: Bioactive Ceramic for Delivery of Therapeutics

Characterization of Structural and Chemical Properties of Silver Containing Hydroxyapatite Synthesized by Solid Phase Reaction T. Murakami, I. Noda, J. Ikeda and A. Nakahira	3
<i>In Vitro</i> Evaluation of Biomimetic Incorporation and Release Kinetics of BMP2 on Functionalized Bio-Oss® Block F. Teng and Y.L. Liu	7
Fabrication of Hydroxyapatite Microcapsules for Controlled Release of Hydrophobic Drug T. Matsunaga, T. Yabutsuka, S. Takai and T. Yao	12
Controlled Ion Release Property of Glass Ionomer Cement Containing Nanoporous Silica Particles K. Nakanishi, Y. Bando, T. Katsurayama, S. Morimoto, S. Abe, S. Yamagata, Y. Yoshida and J. Iida	17
Thermoresponsive Drug Release from Polymer Coated Nano Iron Oxide Embedded on Hydroxyapatite Y. Yokogawa, T. Yokomizo, A. Shishido and H.K. Varma	21
Chlorhexidine Adsorption in Hydroxyapatite and Alginate Microspheres by Extrusion in Zinc and Calcium Chloride N.M.E. Ayad, D. Navarro da Rocha, A.M. Costa and M.H. Prado da Silva	25
Effect of the Pore Diameters and Amino-Organo Functional Structures on Mesoporous Silicas for DNA Adsorption R. Hikosaka, F. Nagata, M. Tomita and K. Kato	31
VSC Sorption onto Mg-Fe-F Layered Double Hydroxide and its Fluoride Release in Aqueous Solution Y. Yokogawa, S. Namba, J. Kinoshita, Y. Morita, K. Fujii, M. Hotta and Y. Doi	37
Spectroscopic Studies of Adsorbed Myoglobin on Zinc Containing Hydroxyapatite A.M. Costa, E. Mavropoulos, A.M. Rossi and M.H. Prado da Silva	41
Protein Adsorption Behavior of Hydroxyapatite during Hydrothermal Synthesis T. Nagasaki, F. Nagata, M. Sakurai and K. Kato	46

Chapter 2: Preclinical and Clinical Evaluation of Bioceramic Bone Grafts

Enhancement of Vertical Alveolar Ridge Augmentation in Canine Defect Model Grafted with Resorbable Bioceramic Composite R. Fahmy, S. Soliman, A. El-Ghannam and S.R. Nouh	53
An Intrinsic Angiogenesis Approach and Varying Bioceramic Scaffold Architecture Affect Blood Vessel Formation in Bone Tissue Engineering <i>In Vivo</i> D. Adel-Khattab, M. Kampschulte, B. Peleska, R. Gildenhaar, G. Berger, C. Gomes, U. Linow, J. Günster, A. Houshmand, M. Stiller, K. Abdel Ghaffar, A. Gamal, M. El-Mofty and C. Knabe	58
Stability Assessment of 85 Sandblasted and Laser-Etched Surface Zirconia Implant Using the Periotest Method over 4 Months of Bone Integration Time S. Noubissi and C. Piconi	65
Prospective Study of the Mastoid Plasties Using Resorbable Bioceramic MBCP® in Surgery of Cholesteatoma H. Dercourt, C.H.A. Le Thuaut, G. Michel, K. Buquet, G. Daculsi and P. Bordure	69

Chapter 3: Cell Response to Bioceramic Characteristics *In Vitro*

The HL-60 Cells Response to Various Particle Sizes of Tetracalcium Phosphate Ceramic Delivery System	
H. Benghuzzi and M. Tucci	77
Development of a Synthetic Tissue Engineered 3D Printed Calciumalkaliphosphate-Based Bone Graft with Homogenously Distributed Osteoblasts and Mineralizing Bone Matrix <i>In Vitro</i>	
D. Adel-Khattab, F. Giacomini, B. Peleska, R. Gildenhaar, G. Berger, C. Gomes, U. Linow, M. Hardt, J. Günster, A. Houshmand, M. Stiller, K. Abdel Ghaffar, A. Gamal, M. El-Mofty and C. Knabe	82
Effect of Silicate Incorporation in Alpha-Tricalcium Phosphate on Behaviors of Osteoblast-Like Cells	
M. Kamitakahara, T. Shirato, T. Yokoi, H. Matsubara, Y. Shibata and T. Ikeda	90
Colloidal Apatite Nanoparticles: Insights on their Interaction with Cells and Artificial Lipid Membranes	
C. Drouet, J.B. Fleury, M. Stefanic, M. Choimet, A. Al-Kattan, H.M. Kim, J.M. Oh, A. Tourrette, V. Santran, B. Pipy and K. Ward	95
Preparation and Application of a Potassium-Substituted Calcium Phosphate Sheet as a Dental Material for Treating Dentin Hypersensitivity	
N. Kato, Y. Hatoko, E. Yamamoto, T. Furuzono and S. Hontsu	102
<i>In Vitro</i> Characterization of 3D Beta-Tricalcium Phosphate Scaffolds Reinforced with Phosphate Based-Bioactive Glass for Bone Replacement	
C. Ruiz-Aguilar, E.A. Aguilar-Reyes, A.E. Higareda-Mendoza and C.A. León-Patiño	108
Synthesis and <i>In Vitro</i> Characterization of Carbon Nano Tube-Polycaprolactone Composite Scaffold for Odontoblast Cell Interaction	
M.A. Ketabi, M. Shahnavaizi, R. Fekrazad, F. Tondnevis, H. Keshvari, M. Raz, A. Sadeghi and M.M. Abolhasani	114
Osteoblastic Cells Response to Albumin Coatings on Zinc Containing Hydroxyapatite	
A.M. Costa, E. Mavropoulos, M. Tanaka, D. Navarro da Rocha, F. Mendonça Fonseca and M.H. Prado da Silva	120
Simultaneous Identification of Amorphous Calcium Phosphate and <i>S.epidermidis</i> Bacteria by Photoacoustic Spectroscopy	
A. Brangule, K. Gross, I. Skadins, A. Reinis and J. Kroiča	125
Characteristics and Biocompatibility of the Hydroxyapatite Based Two Ternary Biocomposites	
B. Bulut, Z.E. Erkmén and E.S. Kayali	130

Chapter 4: Synthesis and Characterization of Bone Cement

Preparation of Brushite Bone Cement with a Drug Containing β-Tricalcium Phosphate Granules	
I.C. Lee, T.J. Chung and K.S. Oh	143
Basic Properties of Novel Bioactive Cement Based on Silica-Calcium Phosphate Composite and Carbonate Apatite	
M.N. Zakaria, A. Cahyanto and A. El-Ghannam	147
Brushite Bone Cement Prepared from Granular Hydroxyapatite and β-Tricalcium Phosphate	
Y.J. Son, T.J. Chung and K.S. Oh	153
Fabrication and Characterization of Chelate-Setting β-Tricalcium Phosphate Cements with Enhanced Bioresorbability	
K. Nagata, T. Konishi, M. Honda and M. Aizawa	157
An Evaluation of Bioactive Glass/Calcium Phosphate Cement Composite, Synthesized via Sol-Gel Method	
M. Shahrezaee, M. Raz, M. Sanati, A. Sadeghi, F. Tondnevis, M.M. Abolhasani and F. Moztarzadeh	162
Mechanical Strength Improvement of Apatite Cement Using Hydroxyapatite/Collagen Nanocomposite	
A. Cahyanto, K. Tsuru, K. Ishikawa and M. Kikuchi	167

Chapter 5: Calcium Phosphate Coating

Bioactivity Treatments for Zirconium and Ti-6Al-4V Alloy by the Function of Apatite Nuclei

Y. Kidokoro, T. Yabutsuka, S. Takai and T. Yao 175

Fabrication of Bioactive Cobalt-Chromium Alloys by Incorporation of Apatite Nuclei

T. Yabutsuka, H. Mizutani, S. Takai and T. Yao 180

Apatite Coatings from Ostrich Eggshell and its Bioactivity Assessment

R.L.S. Blazutti Marçal, J.R. Muniz Ferreira, L.H.L. Louro, A.M. Costa, D. Navarro da Rocha, J.B. de Campos and M.H. Prado da Silva 185

Adhesion Characterization of Zinc-Substituted Hydroxyapatite Coatings

M.H. Prado da Silva, D. Navarro da Rocha, F.N. Moura, A.M. Costa and L.H.L. Louro 189

Bioactivity Assessment of Calcium Phosphate Coatings

D. Navarro da Rocha, L.R. de Oliveira Cruz, D.Q. Mijares, R.L.S. Blazutti Marçal, J.B. de Campos, P.G. Coelho and M.H. Prado da Silva 193

Temperature Influence on the Calcium Phosphate Coatings by Chemical Method

D. Navarro da Rocha, L.R. de Oliveira Cruz, D.Q. Mijares, R.L.S. Blazutti Marçal, J.B. de Campos, P.G. Coelho and M.H. Prado da Silva 197

Chapter 6: Methods of Preparation and Characterization of Hydroxyapatite Based Implants

Preparation of Hydroxyapatite Honeycomb through Dissolution-Precipitation Reaction under Hydrothermal Condition

Y.J. Kim, S.B. Cho, I.Y. Kim and C. Ohtsuki 203

Natural Hydroxyapatite Synthesis from Fish Bones: "Atlantic Bonito" (*Sarda sarda*)

O. Gunduz, O. Kilic, N. Ekren, H. Gokce, C. Kalkandelen and F.N. Oktar 207

Study of Morphological Behavior of Hydroxyapatite, EDTA Hydroxyapatite and Metal Doped EDTA Hydroxyapatite Synthesized by Chemical Co-Precipitation Method via Hydrothermal Route

B.N. Bhattacharjee, V.K. Mishra, S.B. Rai, O. Parkash and D. Kumar 210

Chemical State of Nitrogen in Nitrogen-Doped Hydroxyapatite Ceramics with Enhanced Bioactivity

R. Namiki, T. Suyama, C. Izawa, T. Ikeda-Fukazawa, M. Honda, T. Watanabe and M. Aizawa 215

Slip Casting Used as a Forming Technique for Hydroxyapatite Processing

R.L.S. Blazutti Marçal, D. Navarro da Rocha and M.H. Prado da Silva 219

Fabrication of Chitosan-Nano Hydroxyapatite Scaffold for Dental Tissue Engineering

M. Shahnnavazi, M.A. Ketabi, R. Fekrazad, F. Moztarzadeh, A. Sadeghi, F. Tondnevis, M. Raz, M.M. Abolhasani and M. Rezaei-Tavirani 223

Electrospun Poly(ϵ -Caprolactone)/Bovine Hydroxyapatite (BHA) Composite Nanofibers for Bone Tissue Engineering

M.K. Keler, S. Daglilar and O. Gunduz 228

Synthesis of Ag-Hydroxyapatite

F. Mendonça Fonseca, A.M. Costa, R.L.S. Blazutti Marçal, D. Navarro da Rocha, J.B. de Campos and M.H. Prado da Silva 234

Chapter 7: Synthesis and Characterization of Bioactive Glasses and Composites

Fabrication of Bioactive Glass Fiber Reinforced Polyamide with High Mechanical Performance by the Function of Apatite Nuclei

T. Yabutsuka, K. Fukushima, Y. Kidokoro, T. Matsunaga, S. Takai and T. Yao 241

Fabrication of Bioactive Fiber Reinforced Polyetheretherketone by the Function of Apatite Nuclei

T. Yabutsuka, K. Fukushima, Y. Kidokoro, T. Matsunaga, S. Takai and T. Yao 246

Synthesis and Characterization of CaO-SiO₂-MgO Bioactive Glass Produced by Sol-Gel N.M.E. Ayad, A.B. da Silva Figueiredo, W. de Araujo Gonzalez, D. Navarro da Rocha, R.L.S. Blazutti Marçal and M.H. Prado da Silva	252
Mechanical and Physical Properties of Dentine-Glass Composites B. Ozbek, O. Kilic, Ö. Gunduz, N. Ekren, H. Gokce and F.N. Oktar	257
Silica Sol-Gel Patterned Surfaces Based on Dip-Pen Nanolithography and Microstamping: A Comparison in Resolution and Throughput S. Arango-Santander, S.C. Freitas, A. Pelaez-Vargas and C. García	264
Optimization of Humid Conditions Using an Ultrasonic Nebulizer for the Fabrication of Hydroxyapatite Film with the Er:YAG Laser Deposition Method E. Yamamoto, N. Kato, Y. Hatoko and S. Hontsu	269
Characterization of Piezoelectric and Bioactive NaNbO₃ from Metallic Niobium and Niobium Oxide M.H. Prado da Silva, D. Navarro da Rocha, L.M.S. Azevedo, L.H.L. Louro and A.M. Costa	275
Niobophosphate Glass as Sintering Additive for Al₂O₃-YAG R. de Freitas Cabral, M.H. Prado da Silva, J.B. de Campos, A. Raybolt, E.P. Lima Jr. and E. de Sousa Lima	279

Chapter 8: Zirconia and Alumina Bioceramics

Microstructure Analysis of Zirconia-Alumina-Silica Particles Made from Indonesia Natural Sand Synthesized Using Spray Pyrolysis Method N. Djustiana, R. Febrida, C. Panatarani, Y. Imarundha, E. Karlina and I.M. Joni	285
Synthesis and Characterization of MgPSZ-PMMA Composite by Sol-Gel Modification and Direct Foaming Technique Using Egg Whites V. Takarini, A. Rudyawan, A. Hardiansyah, R. Septawendar, N. Prastomo, Z. Hasratiningsih, N. Djustiana and B.S. Purwasasmita	290
Wear and Corrosion Resistance of Low Temperature Degradation Free ZTA for Artificial Joint J. Ikeda, T. Murakami, T. Sasaki, T. Shimozono, Y. Shouyama and M. Iwamoto	296