

Table of Contents

Preface

In Vivo Apatite Formation Induced on Titanium Metal and Its Alloys by Chemical Treatment

T. Kokubo, H.M. Kim, S. Nishiguchi and T. Nakamura 3

Preparation and Characterisation of Hydroxyapatite and Carbonate Substituted Hydroxyapatite Granules

N. Patel, S. Best, I.R. Gibson, S. Ke, K.A. Hing and W. Bonfield 7

Engineering Crystal Growth of Calcium Hydrogenphosphate Dihydrate

M. Sikirić, V. Babic-Ivancić, O. Milat, S. Sarig and H. Füredi-Milhofer 11

Evaluation of the Quality of Calcium Phosphate Bioceramics via a Study of the Effects of Thermal Processing

B.J. Meenan, A. Boyd, E.R. Love and M. Akay 15

Growth of Brushite Crystals in Sodium Silicate Gel and their Characterization

R.R. Kumar and M. Wang 19

Surface Active Site Design Derived from Cattle Bone-Originated Apatites to Control the Characteristic Adsorption of Different Proteins

M. Kobayashi, T. Akazawa, T. Kanno and J. Horiuchi 23

Hydrogencarbonate as a Biological Buffer in Simulated Plasma

P.A.A.P. Marques, M.C.F. Magalhães, S.V. Dorozhkin and R.N. Correia 27

In Vitro Biomineralization of Chitosan

M.M. Beppu and C.C. Santana 31

Blood Compatibility and SOD Activity of H₂O₂-Oxidized Titanium Substrates

S. Takemoto, K. Tsuru, S. Hayakawa, A. Osaka and S. Takashima 35

Synthesis of Bioactive Organic-Inorganic Hybrid from Methacryloxypropyltrimethoxysilane and 2-Hydroxyethylmethacrylate

C. Ohtsuki, T. Miyazaki and M. Tanihara 39

Bonelike Apatite Formation on Niobium Oxide Gel in a Simulated Body Fluid

T. Miyazaki, H.M. Kim, T. Kokubo, H. Kato, N. Nakamura and C. Ohtsuki 43

Revised Simulated Body Fluid

H.M. Kim, T. Miyazaki, T. Kokubo and T. Nakamura 47

TEM-EDX Study of Process of Apatite Formation on Bioactive Titanium Metal in Simulated Body Fluid

H.M. Kim, H. Takadama, T. Kokubo and T. Nakamura 51

Affinity of Hydroxyapatite to Metal Cations - A Study on the Composition and Structure of Phosphates formed in the Presence of Titanium and Aluminium

C.C. Ribeiro and M.A. Barbosa 55

Bioactivity Assessment of Hydroxyapatite Coatings Produced by Alkali Conversion of Monetite

M.H. Prado da Silva, G.D. de Almeida Soares, C.N. Elias, I.R. Gibson and S. Best 59

Laser Deposited Calcium Phosphate Films, as Sublayers for Biomimetics Growth of Biocompatible Coatings

E.N. Antonov, V.N. Bagratashvili, L.I. Krotova and V.K. Popov 63

In Vitro Dissolution of Various Calcium-Phosphate Coatings on Ti6Al4V

F. Barrère, P. Layrolle, M. Stigter, C.A. van Blitterswijk and K. de Groot 67

Incorporation of Proteins into Biomimetic Hydroxyapatite Coatings

Y.L. Liu, P. Layrolle, C.A. van Blitterswijk and K. de Groot 71

Sodium Silicate Gel Induced Self-Mineralization of Different Compact and Porous Polymeric Structures

A.L. Oliveira, P.B. Malafaya and R.L. Reis 75

In Vitro and in Vivo Studies on the Thin and Defect-Free Calcium Phosphate Films Formed by Electron-Beam Evaporation

D.H. Kim, S.H. Kwon, S.H. Hong, H.E. Kim, I.S. Lee and Y.C. Jung 79

A Novel Auto-Catalytic Deposition Methodology to Produce Calcium-Phosphate Coatings on Polymeric Biomaterials

I.B. Leonor and R.L. Reis 83

Structured Porous Titania as a Coating for Implant Materials F. Heidenau, F. Stenzel and G. Ziegler	87
Biodegradation Study of Calcium Metaphosphate Coated by Sol-Gel Method in the SBF and Tris-Buffer Solution S. Oh, S.Y. Kim, C.K. You and S.Y. Kim	91
Calcium Phosphate Coatings Produced by Ion Beam Sputtering/Mixing Deposition: Their Manufacture, Structure and In Vitro Properties C.X. Wang, Z.Q. Chen and M. Wang	95
Porous Hydroxyapatite Template Grown on Self-Assembly of Lysozyme and Saccharose and Langmuir- Blodgett Thin Films D. Cavinatto, C.A.C. Zavaglia and N. Costa	99
Formation of Calcium-Phosphate Films with Gradient Composition on Alumina Ceramics by Spray-Pyrolysis Technique and Their Biocompatibilities by Cell-culture Tests M. Aizawa, T. Yamamoto, K. Itatani, H. Suemasu, A. Nozue and I. Okada	103
Influence of Target Density on Properties of Laser Deposited Calcium Phosphate Coatings E.N. Antonov, V.N. Bagratashvili, M. Ball, S. Downes, D.M. Grant, S.M. Howdle, L.I. Krotova, W.J. Lo and V.K. Popov	107
Hydroxyapatite's Solubility May Cause Loosening of Coated Implants G. Berger, U. Ploska and G. Willmann	111
Dry Mechanochemical Synthesis of Apatites and other Calcium Phosphates P. Boudeville, B. Pauvert, M.P. Ginebra, E. Fernández and J.A. Planell	115
In Vitro Carbonated Apatite Precipitation on Biphasic Calcium Phosphate Pellets Presenting Various HA/β-TCP Ratios J.M. Bouler and G. Daculsi	119
Bioactive Glass-Ceramics Coatings on Alumina C. Vitale-Brovarone, E. Verné, F. Lupo, C. Moiescu, L. Zanardi, M. Bosetti and M. Cannas	123
Bioactive Hydroxyapatite Coating on PHEMA by Means of the Biomimetic Method F. Branda, A. Costantini, G. Luciani, G. Laudisio, L. Ambrosio and L. Rimondini	127
Biodegradation Study of Amorphous and Crystalline Calcium Metaphosphate in the SBF and Tris-Buffer Solution S.S. Chun, J.H. Jeong, K.H. Kim and S.Y. Kim	131
Control of Crystallinity and Composition in Calcium Phosphate Coatings M. Cifuentes, M.V. Cabañas and M. Vallet-Regí	135
Mechanical and Microscopic Features of Hydroxyapatite Coatings on Titanium Substrates with a Bond Coat P. Parakala and R. Clegg	139
Identification and Evaluation of HPO_4 Ions in Biomimetic Poorly Crystalline Apatite and Bone Mineral C. Combes, C. Rey and S. Mounic	143
Biomimetic Approach for Strontium-Containing Ca-P Bioceramics with Enhanced Biological Activity S. Cazalbou, C. Combes and C. Rey	147
Mechanical Behaviour of New Zirconia-Hydroxyapatite Ceramic Materials J.A. Delgado, S. Martínez, M.P. Ginebra, L. Morejón-Alonso, N. Carlsson, E. Fernández, J.A. Planell, M.T. Clavaguera-Mora and J. Rodríguez-Viejo	151
Solid-State Transformation of a Non-Stoichiometric Calcium Deficient Apatite into the Biphasic Calcium Phosphate S.V. Dorozhkin	155
Bioactivity of Hydrothermal-Electrochemically Deposited Apatite in Vitro and in Vivo S. Ban, N. Arimoto, A. Harada, J. Hasegawa and S. Maruno	159
The Precipitation of Bone-Like Apatite on the Surface of Calcium Phosphate - the Effect of Bovine Serum Album H.S. Fan, S.X. Qu and X.D. Zhang	163
Calcium Phosphate Coating on Titanium Induced by Phosphating B. Feng, J.Y. Chen and X.D. Zhang	167
On the Sintering Characteristics of Calcium Polyphosphates M. Filiaggi, R.M. Pilliar and J. Hong	171

Production and Characterisation of Hydroxyapatite to be Used as Coating on Prostheses via Powder Metallurgy	
A. Gomes da Silva, V.P. Bavaresco, C.A.C. Zavaglia, I. Conte and N. Costa	175
Cathodoluminescence Emission for Differentiating the Degree of Carbonation in Apatites	
K.A. Gross, M.R. Phillips and Y. Suetsugu	179
Particulate Generation in Plasma Sprayed Hydroxyapatite Coatings	
K.A. Gross, N. Ray and M. Røkkum	183
Structure and Composition Comparison of Bone Mineral and Apatite Layers Formed in Vitro	
L.H. Guo, M. Huang, Y. Leng, J.E. Davies and X.D. Zhang	187
Effect of Carbonate Contents on Crystal Structure of A-Type Carbonate Apatites	
T. Ikoma, Y. Kubo, A. Yamazaki, M. Akao and M. Tanaka	191
The Influence of Processing Parameters on the HA Products of RF Thermal Plasma-Sprayed HA/Ti Composite Coatings	
M. Inagaki, Y. Yokogawa and T. Kameyama	195
Resorbability Reduction by the Incorporation of Zinc into Tricalcium Phosphate	
A. Ito, H. Kawamura, S. Miyakawa, P. Layrolle, R. Aomori and S. Tsutsumi	199
Influence of Synthesis Parameters on the Particle Sizes of Nanostructured Calcium-Hydroxyapatite	
D. Janačković, I. Petrovic-Prelevic, L. Kostic-Gvozdenovic, R. Petrović, V. Jokanović and D.P. Uskokovic	203
Definition of Silver Concentration in Calcium Phosphate Coatings on Titanium Implants Ensuring Balancing of Bactericidity and Cytotoxicity	
A.V. Karlov, V.P. Shakhov and Y.R. Kolobov	207
Action of Bending Deformation on Electrochemical Properties of Ceramic Coatings on Titanium Implants	
A.V. Karlov, O.I. Nalesnick, E.A. Eremkina and M.I. Mockshina	211
Ceramic Coatings on the High-Strength Titanium as Prospective Material for Orthopaedic Implants	
A.V. Karlov, Y.R. Kolobov, E.E. Saguymbaev, G.A. Shashkina and R. Valiev	215
Phosphate Precipitation at Surface of Bioactive Glasses	
K.H. Karlsson, M. Hupa and R. Backman	219
Preparation of Calcium Phosphate Glass-Ceramics and their Coating on Titanium Alloys	
T. Kasuga, M. Nogami and M. Niinomi	223
Mechanical Properties of Bioactive Titanium Metal Prepared by Chemical Treatment	
H.M. Kim, Y. Sasaki, J. Suzuki, S. Fujibayashi, T. Kokubo, T. Matsushita and T. Nakamura	227
Production and Evaluation of Hydroxyapatite-Tricalcium Phosphate Functionally Graded Coating	
R.R. Kumar, M. Wang and P. Ducheyne	231
Calcium Phosphate Cement to Prepare Sr-Containing Biomaterials	
L. Leroux, J.L. Lacout and M. Frèche	235
Preparing Plate-Like HAP by the Pulse Addition	
X.M. Chen, S.P. Li and F. Liang	239
Emulsion Crosslinking as a New Manufacturing Route to Produce Hydroxylapatite Particulates in a Network of Starch	
P.B. Malafaya, F. Stappers and R.L. Reis	243
Synthesis and Characterisation of Silicon-Substituted Hydroxyapatite	
P.A.A.P. Marques, M.C.F. Magalhães, R.N. Correia and M. Vallet-Regí	247
Spectroscopic and Ultrastructural Analysis of Fluorhydroxyapatite-Coated Titanium Plates	
D. Martini, M. Raspanti, V. Ottani, P. Monti, P. Taddei, A. Tinti, C. Fagnano and A. Ruggeri	251
Control and Manipulation of Residual Gases during RF Magnetron Sputter Deposition of Calcium Phosphate Coatings	
E.R. Love, M. Weimper, A. Boyd, M. Akay and B.J. Meenan	255
Preparation of Porous Hydroxyapatite Tablets and Porous Hydroxyapatite Coatings for Orthopaedic Use	
M. Méndez-González and J.V. Cauich-Rodriguez	259
Biomimetic Deposition of Apatite on Electrochemically Oxidized Titanium Substrates	
A. Osaka, D. Aslanidis, S. Hayakawa and K. Tsuru	263

CaCO₃/Ca-P Biphasic Materials Prepared by Microwave Processing of Natural Aragonite and Calcite	
J. Peña, R.Z. LeGeros, R. Rohanizadeh and J.P. LeGeros	267
Electrolytic Coating of Calcium Phosphate on Titanium: Optimisation of the Conversion of Monetite to Hydroxyapatite	
J.F. Oliveira, L.Á. de Sena, M.H. Prado da Silva, G.D. de Almeida Soares and A.M. Rossi	271
Textural and Surface Properties of Hydroxyapatite Synthesized in Different Conditions	
A.M. Rossi, E.M. Lima, T. Moure, G.D. de Almeida Soares and C.A.C. Perez	275
Glass-Ceramics as Coatings for Prostheses	
B. Dubini, A. Krajewski, M. Mazzocchi, M.G.P. Bossi, A. Ravaglioli, G. Rizzi, F. Rustichelli, V. Stanic, R. Giardino, N. Nicoli-Aldini, E. Verné and C. Vitale-Brovarone	279
Atomic Scale Interfacial Structure of Hydroxyapatite Observed with High-Resolution Transmission Electron Microscopy	
K. Sato, T. Kogure, T. Ikoma, Y. Kumagai and M. Tanaka	283
Single Crystal Growth and Structure Analysis of Monoclinic Hydroxyapatite	
Y. Suetsugu, T. Ikoma and M. Tanaka	287
Biomimetic Deposition of Calcium Phosphate on Thermally Oxidized Titanium and PTFE Substrates	
D. Aslanidis, A. Osaka, S. Hayakawa and K. Tsuru	291
Study on the Surface Modification of Medical Silicon Rubber by Biomimetic Synthesizing HA	
X.Y. Wang, S.P. Li, Y.H. Yan and J. Yang	295
Biomimetic Mineralisation on Plasma Sprayed Apatite Particles and Coatings in Different Simulated Physiological Fluids	
J. Weng, M. Wang, X.D. Zhang and K. de Groot	299
Preparation and Characteristics of Hydroxyapatite Whisker by Precipitation-Hydrolysis Method	
Y.H. Yan, Y.F. Wang and H.Q. Zhang	303
Calcium Phosphate Formation on the Phosphorylated Chitin Samples from SBF Solution	
Y. Yokogawa, K. Nishizawa, F. Nagata, A. Hozumi, K. Teraoka, M. Inagaki and T. Kameyama	307
Structural Characteristics of Porous Hydroxyapatite Coating on CaO-SiO₂ System Glass	
H.Q. Zhang, Y.H. Yan and S.P. Li	311
Analysis of Osteoblast Activity around Beta-TCP Particles Implanted into Bone: Expression of Bone Matrix Protein mRNAs	
K. Ohsawa, M. Neo, H. Matsuoka, H. Akiyama, H. Ito and T. Nakamura	317
Enhanced Surface and Mechanical Properties of Nanophase Ceramics to Achieve Orthopaedic/Dental Implant Efficacy	
T.J. Webster, R.W. Siegel and R. Bizios	321
The Effect of CaCO₃ and TiO₂ Nanometer Particles on A₅₄₉ and L₉₂₉ Cells	
L.Y. Feng, S.P. Li, Y.H. Yan and C.S. Liu	325
Examination of Zirconia, Alumina Ceramics and Titanium Interactions on Human Osteoblasts in Culture	
Y. Josset, Z. Oum'Hamed, C. Dupont, C. Trentesaux and D. Laurent-Maquin	329
Modulation of Adherence of Osteoblast-Like Cells by Electrical Polarization of Hydroxyapatite Ceramics	
T. Kizuki, M. Ohgaki, M. Katsura, K. Hashimoto, Y. Toda, S. Udagawa and K. Yamashita	333
Study of High Melting Bioactive Glass-Ceramic to Produce Bone Filling Material	
A. Krajewski, A. Ravaglioli, M. Mazzocchi and G. Foresti	337
Comparative Studies on Tissue Reaction of Newly Sintered and Conventionally Sintered Hydroxyapatite	
K. Nishihara, T. Ueda, K. Hirota, A. Ravaglioli and A. Krajewski	341
In Vitro Interactions of Bone Marrow Cells with Carbonate and Fluoride Containing Apatites	
T. Sakae, K. Hoshino, Y. Fujimori, Y. Kozawa and R.Z. LeGeros	347
Healing and Differentiation of Human Osteoblasts on Titanium-Zirconia Composite Material: The Effect of Different Brazing Fillers	
N. Specchia, A. Pagnotta and A. Toesca	351
Can Porosity Influence the Osteoconductive Properties of Synthetic Hydroxyapatite?	
N. Specchia, A. Pagnotta and F. Greco	355

Assessment of Immuno-Allergological Properties of Ceramic and Metallic Compounds in Vitro P. Thomas	359
Osteoblastic Tolerance of Some Bioactive Coverings for Zirconia First Results S.H. Zhou, R.R.H. Coombs, A. Krajewski and A. Ravaglioli	363
Quantification of Matrix Protein mRNAs Expression During Mineralized Tissue Formation in Rat Marrow Cell Culture by a Real Time Quantitative PCR Method Y. Dohi, H. Nakajima, H. Ohgushi and K. Yonemasu	367
Influence of Phase Purity on the in Vivo Response to Hydroxyapatite K.A. Hing, I.R. Gibson, P.A. Revell, S. Best and W. Bonfield	373
Tricalcium Phosphate/Hydroxyapatite Mixtures as Bone Allograft Expanders in Revision Total Hip Arthroplasty of the Femur: An Ovine Study A.W. Blom, J.L. Cunningham, T.J. Lawes, G. Hughes, A.E. Goodship and I.D. Learmonth	377
Tissue Response in the Femur of Rabbits after Implantation of a New Calcium Titanium Phosphate Composition U. Gross, C. Müller-Mai, C. Voigt, M. Mesgarian, G. Berger and U. Ploska	383
Effects of Zinc-Releasing Calcium Phosphate Ceramics Implanted in Rabbit Femora H. Kawamura, A. Ito, S. Miyakawa, K. Ojima, N. Ichinose and T. Tateishi	387
Biomimetic Calcium Phosphate Coatings and Their Biological Performances P. Layrolle, C. van der Valk, R. Dalmeijer, C.A. van Blitterswijk and K. de Groot	391
Evaluation of BONIT[®], a fully Resorbable CaP Coating Obtained by Electrochemical Deposition, after 6 Weeks of Healing: A Pilot study in the Pig Maxilla S. Szmukler-Moncler, D. Perrin, V. Ahossi and P. Pointaire	395
HA Coating with Different Crystallinity Percutaneously Implanted in Bone B.C. Yang, J.Y. Chen, J.M. Feng and X.D. Zhang	399
Bone Response to Zirconia Ceramic Implants; an Experimental Study in Rabbit F. Di Carlo, L. Prosper, F. Ripari and A. Scarano	403
Transformation of Different Calcium Phosphates after Implantation A.M. Gatti, R.Z. LeGeros, E. Monari and D. Tanza	409
Bioactivity of Bioactive Sol-Gel Glasses Coated Alumina Implants M. Hamadouche, A. Meunier, D.C. Greenspan, C. Blanchat, J.P. Zhong, G.P. La Torre and L. Sedel	413
Bone Bonding in Bioactive Glass Ceramics Combined with a New Synthesized Agent TAK-778 H. Kato, S. Nishiguchi, M. Neo, J. Tamura, K. Kawanabe and T. Nakamura	417
Calcium Metaphosphate Fibers for Biomedical Use Y. Ota, T. Iwashita, T. Kasuga, E. Spiecker and A. Seki	421
Macroporous Calcium Phosphate Ceramics: Optimization of the Porous Structure and its Effect on the Bone Ingrowth in a Sheep Model O. Richart, M. Descamps and A. Liebetrau	425
Role of Peri-Implant Medullary Cisternae in the Osseo-Integration of Smooth Surface Endosseous Dental Implants A. Ruggeri, M. Franchi, M. Raspanti, D. Martini, V. Ottani, R. Strocchi, V. De Pasquale and G. Tretola	429
Starch Based Copolymers as Biomaterials in Vivo Biocompatibility Study V. Souillac, J.C. Fricain, R. Bareille, R.L. Reis, D. Chauveaux and C. Baquey	433
Effects of Hydroxyapatite Spots on New Bone Formation K. Teraoka, T. Nonami, A. Kamiya, A. Watazu, Y. Yokogawa, H. Taoda, K. Naganuma, S. Tsutsumi and T. Kameyama	437
Smart Calcium Phosphate-Based Bioceramics with Intrinsic Osteoinductivity M.E. Thomas, P.W. Richter, J. Crooks and U. Ripamonti	441
Mechanical Properties and Biocompatibility of Titanium-Hydroxyapatite Implant Material Prepared by Spark Plasma Sintering Method A. Yokoyama, F. Watari, R. Miyao, H. Matsuno, M. Uo, T. Kawasaki, T. Kohgo, M. Omori and T. Hirai	445
Histological Studies of Double Layer HA/CaO-P₂O₅ Glass Plasma Sprayed Coatings using Rabbit Model M.P. Ferraz, J.D. Santos, A. Afonso, A.R. Vasconcelos and F.J. Monteiro	449

Osteoconduction and Bioresorption of Sintered Carbonate Apatite M. Hasegawa, T. Ohashi, T. Tani and Y. Doi	453
New Biomaterials, Stem Cells and Morphogens for Tissue Engineering A.H. Reddi	459
Ceramic Materials and Growth Factors H. Ohgushi, Y. Dohi, T. Noshi, M. Ikeuchi, T. Yoshikawa, M. Okumura, H. Nakajima and Y. Takakura	463
3-D Bone Tissue Engineering with Bioactive, Resorbable Microcarriers Q. Qiu, P. Ducheyne and P.S. Ayyaswamy	467
In Vivo Loading of Calcium Phosphate Ceramics with Osteogenic Cells P. Frayssinet, D. Mathon and N. Rouquet	471
Bone Regeneration with Cultured Human Bone Grafts T. Yoshikawa, H. Ohgushi, T. Uemura, Y. Ueda, H. Nakajima, Y. Enomoto, K. Ichijima, Y. Takakura and T. Tateishi	475
Apatite Coating in / on Rabbit Tendons Using an Alternate Soaking Process S. Tanaka, M. Sakane, M. Tanaka, I. Yamaguchi, H. Shimojo, K. Kato, T. Tateishi and Y. Miyanaga	479
Molecularly Engineered Hydroxylapatite P. Sharrock, C. Zahraoui, K. Anselme, M. Rouahi, B. Noël, T. Grard, J. Jeanfils and P. Hardouin	483
Fabrication and Animal Experiment of Nanocomposites of Hydroxyapatite Collagen and Polysaccharides T. Ikoma, T. Muneta and M. Tanaka	487
Osteogenic Potential of Porous β-Tricalcium Phosphate (β-TCP) Combined with Cultured Bone. - Tissue Engineered Bone Using a Biodegradable Material as a Scaffold S. Fu, T. Yoshikawa, Y. Hibino, Y. Yamada, A. Niimi, M. Honda, Y. Okazaki, K.I. Hata and M. Ueda	491
Bone Formation by Autogenous Grafting of Cultured Bone/Porous Ceramic Constructs in a Dog J. Iida, T. Yoshikawa, Y. Ueda, H. Ohgushi, T. Uemura, Y. Enomoto, K. Ichijima, Y. Takakura and T. Tateishi	499
In Vitro Bone Formation by Human Marrow Cell Culture on the Surface of Zinc-Releasing Calcium Phosphate Ceramics M. Ikeuchi, Y. Dohi, H. Ohgushi, T. Noshi, K. Horiuchi, K. Yamamoto, M. Sugimura and A. Ito	503
Porous Hydroxyapatite Cell Carrier for Tissue Engineering R. Martinetti, A. Belpassi, A. Nataloni and C. Piconi	507
Site Dependence of Bone Formation Induced by rhBMP-2: Comparing Rat Parietal Bone and Heterotopic Back Region H. Nagatsuka, N. Nagai, T. Sakae and R.Z. LeGeros	511
Development of Revolutionizing Biomaterials Substituting Various Mammalian Organs by Means of Sintered Bioceramics T. Ueda, K. Hirota and K. Nishihara	515
Apatite-Forming Ability of Zirconia / Alumina Composite Induced by Chemical Treatment M. Uchida, H.M. Kim, T. Kokubo, M. Nawa, T. Asano, K. Tanaka and T. Nakamura	519
Design of Ceramic Acetabular Components: A Retrospective G. Willmann	525
Micro-Separation in Vitro Produces Clinically Relevant Wear of Ceramic-Ceramic Total Hip Replacements J. Nevelos, E. Ingham, C. Doyle, R. Streicher, A. Nevelos and J. Fisher	529
Zirconia-Alumina: An Alternative Bearing for Hip Arthroplasty W. Weber, W. Rieger, J. Clausen and H. Schmotzer	533
Zirconia-Alumina Coupling: Aging of Zirconia Should be Kept out of Concern F. Villiermaux	537
How Much of What is Wear of THRs with Ceramic-on-Ceramic Articulation? A. Walter	541
High Strength and Toughness Alumina Matrix Composites by Transformation Toughening and 'In Situ' Platelet Reinforcement (ZPTA) - The New Generation of Bioceramics W. Burger and H.G. Richter	545
Limitations of Artificial Hip Joint Mobility Due to Wear and Ceramic Cup Design R. Bader, E. Steinhäuser, G. Willmann and R. Gradinger	549

Ageing of Zirconia: Everything You Always Wanted to Know L. Blaise, F. Villiermaux and B. Calès	553
Transformation Kinetics of Y-TZP Zirconia Ceramics in Simulated Physiological Solution S. Frangini, C. Piconi, A. di Bartolomeo and G. Magnani	557
Wear of Alumina on Alumina Total Hip Prosthesis -Effect of Lubricant on Hip Simulator Test- M. Ueno, H. Amino, H. Oonishi, I.C. Clarke and V. Good	561
Ceramics for Joint Replacement: What are the Options for this Millennium G. Willmann	565
Biocompatibility of a New Alumina Matrix Biocomposite AMC G. Willmann, W. von Chamier, H.-. Pfaff and R. Rack	569
A Genetic Theory of Bioactive Materials L.L. Hench	575
Physiological Removal of Silicon from Bioactive Glass W. Lai, J. Garino, C.M. Flaitz and P. Ducheyne	581
Affect of Bioglass® Repeat Dosage on Mineralisation of Embryonic Bone 'in Vitro' J. Maroothernaden and L.L. Hench	585
Silicon Nitride - Bioglass® Composite for Biomedical Applications J.D. Santos, M. Amaral, S.M. Oliveira, M.A. Lopes and R.F. Silva	589
Absorbability of Bulk Sol-Gel Bioactive Glasses M. Hamadouche, A. Meunier, D.C. Greenspan, C. Blanchat, J.P. Zhong, G.P. La Torre and L. Sedel	593
A Novel Sol-Gel Derived Bioactive Glass Featuring Antibacterial Properties M. Bellantone, N.J. Coleman and L.L. Hench	597
Nanoscale Surface Structure of Bioactive Glass (S53P4) as a Function of Immersion Time in SBF M. Jokinen, T. Peltola, J. Simola, J. Korventausta and A. Yli-Urpo	601
55S® Bioglass Stimulates in Vitro Osteoblast Differentiation and Creates a Favorable Template for Bone Tissue Formation S. Loty, J.M. Sautier, C. Loty, M.T. Tan, D.C. Greenspan and N. Forest	605
Bioactive Sol-Gel Glasses in the CaO-SiO₂ System P. Saravanapavan and L.L. Hench	609
Comparison of Three Methods in Evaluation of Bone Ingrowth into Porous Bioactive Glass and Titanium Implants H.O. Ylänen, C. Ekholm, N. Beliaev, K.H. Karlsson and H.T. Aro	613
Bioactive Behaviour of Sol-Gel Derived Antibacterial Bioactive Glass M. Bellantone and L.L. Hench	617
Chemical Durability and Mechanical Properties of Calcium Phosphate Glasses with the Addition of Fe₂O₃, TiO₂ and ZnO J. Clément, G. Avila, M. Navarro, S. Martínez, M.P. Ginebra and J.A. Planell	621
Pore Characterisation and Interconnectivity Studies on Bioactive 58 S Sol-Gel Glass R. Cook, E. Fielder, T. Watson, P. Robinson and L.L. Hench	625
Effect of Particle Size on Bioglass® Dissolution P. Sepulveda, J.R. Jones and L.L. Hench	629
Processing of Bioglass Coatings by Excimer Laser Ablation J. Serra, P. González, S. Chiussi, B. León and M. Pérez Amor	635
Reaction Kinetics of Bioactive Glass and a Resorbable Polysaccharide I. Thompson and L.L. Hench	639
CaO-P₂O₅ Glass Ceramics Containing Bioactive Phases: Crystallisation and in Vitro Bioactivity Studies Y. Zhang, M.A. Lopes and J.D. Santos	643
TEM Examination of the Interface between Bioglass®/Polyethylene Composites and Human Osteoblast Cells In Vitro J. Huang, L. Di Silvio, M. Kayser and W. Bonfield	649
Pre-Treated Bioactive Composite in Rat Soft Tissue T. Tirri, T. Jaakkola, T. Närhi, J. Rich, J. Seppälä and A. Yli-Urpo	653

In Vitro Formation of Bone-Like Apatite on the Surface of Solution-Cast Poorly Crystallised Hydroxyapatite/Chitin Composite J. Weng and M. Wang	657
Bone Cement Made of High Molecular Weight PMMA Resin with Bioactive Ceramic Filler Showed Higher Bone-Bonding Strength than That of Bis-GMA Resin and Bioactive Ceramic Fillers T. Nakamura, H. Kato, Y. Okada, S. Shinzato, K. Kawanabe, J. Tamura and T. Kokubo	661
Osteoconductivity and Mechanical Properties of a New Bioactive Bone Cement S. Shinzato, T. Nakamura, T. Kokubo and Y. Kitamura	665
Structure and Properties of Hydroxylapatite Reinforced Starch Bone-Analogue Composites R.A. Sousa, R.L. Reis, A.M. Cunha and M.J. Bevis	669
Preparation and Mechanical Properties of Chitosan/Hydroxyapatite Nanocomposites I. Yamaguchi, K. Tokuchi, H. Fukuzaki, Y. Koyama, K. Takakuda, H. Monma and M. Tanaka	673
In Vitro Test and Application for Guided Bone Regeneration of β-Tricalcium Phosphate / Poly-(Lactide-Glycolic acid-ϵ-Caprolactone) Composites M. Kikuchi, Y. Koyama, K. Takakuda, H. Miyairi and M. Tanaka	677
Bioactivity and Mechanical Behavior of PTMO-Modified CaO-SiO₂ Hybrids Prepared by Sol-Gel Process N. Miyata, K. Fuke, Q. Chen, K. Masakazu, T. Kokubo and T. Nakamura	681
Bioactive Glass-Polymer Composite for Experimental Bone Reconstruction A. Aho, T. Tirri, J. Seppälä, J. Rich, N. Strandberg, T. Jaakkola, T. Närhi and J. Kukkonen	685
Is There a Chemical Interaction between Calcium Phosphates and Organic Compounds in the Organic/Inorganic Composites? S.V. Dorozhkin	689
Bioactive Polyurethane Implants with Hydroxyapatite R. Rozhnova, I. Kbuladze and N. Galatenko	693
Apatite-Forming Ability of Polymers with Carboxy Groups in Simulated Body Fluid K. Masakazu, M. Nakao, M. Minoda, T. Miyamoto, H.M. Kim, T. Kokubo and T. Nakamura	697
Possibility for Obtaining Bioactive Glass-Ionomer Cements M. Kamitakahara, K. Masakazu, T. Kokubo and T. Nakamura	701
Development of Highly Bioactive and Mechanically Strong Starch Thermoplastic/Bioglass[®] Composite Biomaterials I.B. Leonor, R.A. Sousa, A.M. Cunha, Z.P. Zhong, D.C. Greenspan and R.L. Reis	705
Organ-Derived Dependence of Biomineralization in Type I Collagen Gel T. Matsumoto, M. Okazaki, M. Inoue, Y. Hamada, M. Taira and J. Takahashi	709
Apatite Formation on Ethylene-Vinyl Alcohol Copolymer Modified with Silane Coupling Agent and Calcium Silicate A. Oyane, M. Minoda, T. Miyamoto, K. Nakanishi, K. Masakazu, T. Kokubo and T. Nakamura	713
Coating of Bioactive Glass (13-93) Fibers with Bioabsorbable Polymer T. Paatola, E. Pirhonen and P. Törmälä	717
Bioactive Glass 13-93/P(L/DL)LA Composites in Vitro and in Vivo H. Niiranen, T. Pyhältö, P. Rokkanen, T. Paatola and P. Törmälä	721
Bioactive Glass Fiber/Poly lactide Composite E. Pirhonen, G. Grandi and P. Törmälä	725
Bioresorbable Polymers: Their Potential as Scaffolds for Bioglass[®] Composites A. Stamboulis and L.L. Hench	729
A Three-Dimensional Porous Scaffold of Biodegradable Synthetic Polymers and Porous Hydroxyapatite Beads for Bone Tissue Engineering T. Ushida, T. Tamaki, G.P. Chen, Y. Umezu and T. Tateishi	733
Microstructure and Mechanical Properties of Hot-Pressed Hydroxyapatite/Poly-L-Lactide Biomaterials N. Ignjatović, K. Delijić, M. Vukčević and D.P. Uskokovic	737
Developing Tricalcium Phosphate/Polyhydroxybutyrate Composite as a New Biodegradable Material for Clinical Applications M. Wang, J. Weng, J. Ni, C.H. Goh and C.X. Wang	741
Hydroxyapatite Granules Implanted on Titanium Alloys A. Watazu, A. Kamiya, J. Zhu, T. Nonami, K. Teraoka, T. Sonoda, K. Ushiki and K. Naganuma	745

FTIR Studies on the Effect of Network Connectivity in the Cement Forming Ability of Sol-Gel Glasses in the $\text{SiO}_2\text{-Al}_2\text{O}_3\text{-CaO-CaF}_2$ System	
M.S. Zolotar and C.A.C. Zavaglia	749
A Hybrid Sponge of Poly(DL-Lactic-Co-Glycolic Acid), Collagen and Apatite	
G.P. Chen, T. Ushida and T. Tateishi	753
NMR Spectroscopy of Bone and Bone Substitutes	
A.P. Legrand, B. Bresson and J.M. Bouler	759
Calcium Phosphate Emulsions: Possible Applications	
M. Bohner	765
Setting Reactions Involved in Injectable Cements Based on Amorphous Calcium Phosphate	
A. Tofighi, S. Mounic, P. Chakravarthy, C. Rey and D. Lee	769
Formation of Macropores in Calcium Phosphate Cements through the Use of Mannitol Crystals	
M. Markovic, S. Takagi and L.C. Chow	773
An Experimental Approach to the Study of the Rheology Behaviour of Synthetic Bone Calcium Phosphate Cements	
J. Friberg, E. Fernández, S. Sarda, M. Nilsson, M.P. Ginebra, S. Martínez and J.A. Planell	777
Improvement of the Mechanical Properties of an α-TCP Cement by the Addition of a Polymeric Drug Containing Salicylic Acid	
M.P. Ginebra, A. Rilliard, E. Fernández, C. Elvira, J. San Román and J.A. Planell	781
Effects of Added ZnTCP on Mechanical and Biological Properties of Apatite Cement	
I. Kunio, Y. Miyamoto, T. Toh, T. Yuasa, A. Ito, M. Nagayama and K. Suzuki	785
Formulation of an Injectable Phosphocalcium Cement	
S. Gonçalves, A. Brouchet, M. Frèche, F. Rodriguez, B. Delisle and J.L. Lacout	789
In Vivo Resorption Behavior of a High Strength Injectable Calcium-Phosphate Cement	
J.G.C. Wolke, E.M. Ooms and J.J. Jansen	793
In Vivo Performance Evaluation of Two Processes of Macropores Elaboration for Biphasic Calcium Phosphate Ceramics	
M. Schmitt, E. Aguado, E. Goyenvallé and G. Daculsi	797
In Vivo Comparison of Two Injectable Calcium Phosphate Biomaterials: Ionic Cement and Polymer-Associated Particulate Ceramic	
O. Gauthier, I. Khairoun, P. Weiss, J.M. Bouler, E. Aguado and G. Daculsi	801
The Effect of Blood Contact on the Setting and the Osteointegration Ability of the Calcium Phosphate Bone Cement. Experimental Study in Rabbits	
C. Faldini, A. Moroni, M. Rocca, S. Stea, E. Donati, M. Mosca and S. Giannini	805
Effect of Bioglass Granules on the Physico-Chemical Properties of Brushite Cements	
M. Bohner and S. Matter	809
pH Variations of a Solution after Injecting Brushite Cements	
M. Bohner	813
Physico Chemical Characterization of two Processes of Macropores Elaboration for Biphasic Calcium Phosphate Ceramics	
G. Daculsi and M. Schmitt	817
Properties of the Cement Materials in α-TCP-TTCP-$\text{C}_6\text{H}_8\text{O}_7\text{-H}_2\text{O}$	
H.L. Dai, Y.H. Yan, S.P. Li and X.M. Chen	821
Calcium Phosphate Bone Cement Containing ABK and PLLA - Sustained Release of ABK, the BMD of the Femur in Rats, and Histological Examination -	
T. Kusaka, A. Tanaka, S. Sasaki, I. Takano, Y. Tahara and Y. Ishii	825
Basic Properties of Apatite Cement Containing Carbonate Apatite and Its Resorption by Cultured Osteoclasts	
Y. Miyamoto, T. Toh, T. Yuasa, M. Takechi, Y. Momota, M. Nagayama, I. Kunio and K. Suzuki	829
Healing of Segmental Ulnar Defects in Dog Using Bioresorbable Calcium Phosphate Cement Added with Recombinant Human Bone Morphogenetic Protein-2	
K. Ohura, H. Irie and C. Hamanishi	833
Dynamic Examination of the Femur in a Rat Model of Osteoporosis after Injection of CPC Containing ABK and PLLA	
A. Tanaka, T. Kusaka, S. Sasaki, I. Takano, Y. Tahara and Y. Ishii	837
Hard Tissue Deposition in Dental Pulp Canal by α-Tricalcium Phosphate Cement	
M. Yoshikawa, T. Toda, Y. Mandai and H. Oonishi	841

Effect of Apatite Cements on Human Osteoblasts in Vitro T. Yuasa, Y. Miyamoto, I. Kunio, M. Takechi, Y. Momota, T. Toh, M. Nagayama and K. Suzuki	845
Evaluation of Hydroxyapatite-Putty as a Hemostatic Agent Y. Momota, Y. Miyamoto, I. Kunio, M. Takechi, T. Yuasa, T. Toh, M. Nagayama and K. Suzuki	849
Study on the Applied Properties of Tobramycin-Loaded Calcium Phosphate Cement Y. Huang, C.S. Liu, H.F. Shao and Z.J. Liu	853
Factors in Antagonist Tooth Structure Wear from Dental Ceramic Restorations J.A. Sorensen	863
Bone Augmentation with Bioactive Ceramics before Insertion of Endosseous Dental Implants: Histories and Human Histology on Seventeen Consecutive Cases M.R. Norton and J. Wilson	869
Triphasic Phosphate/Titanate Composites for Preprosthetic Socket Augmentation (Experimental Study) M. Werner, H.H. Beheri, L. Agameya and I. Zaki	873
Bioactive Glass S53P4 in Frontal Sinus Obliteration. A 9-Year Experience K. Aitasalo, M. Peltola, J. Suonpää and A. Yli-Urpo	877
Porous Hydroxyapatite Custom Made Implants for Cranioplasty: Two Years of Clinical Experience A. Nataloni, R. Martinetti, G. Staffa, F. Servadei and C. Piconi	881
Degradation of Glass Eye Prostheses K.A. Gross, S. Walters and B. Chen	885
Blood Compatibility and Protein Adsorption Characteristics of Sol-Gel Derived Titania S. Takashima, S. Takemoto, K. Tsuru, S. Hayakawa and A. Osaka	889
Development of Revolutionizing Methods for Hybrid-Type Artificial Organs by Means of Bioceramics and Biomechanics K. Nishihara, T. Ueda, M. Tanaka and K. Hirota	893
Structural Variations of HCl-Demineralized Biotic Bones of Different Tissue Origins G.T. El-Bassouni and M. Werner	897
Calcium Phosphate Ceramics as Drug-Delivery System for Anticancer Therapy E. Landi, L. Orlandi, G. Spagna, A. Tampieri and N. Zaffaroni	901
Effect of Antimicrobial Agents on Physical Properties of Dental Cements A. Akashi, Y. Matsuya, E. Ito, M. Unemori and A. Akamine	905
Sintering Specifics of Low-Fusing Ceramics for Pfm-Restorations T. Klinke and R. Biffar	909
Evaluation and Consequences of Follow-Up Studies of Dental Implant Systems G. Heimke and W. Hund	917
Clinical Long-Term Evaluation of Hydroxyapatite Granules Implantation in Periodontal Defects A.M. Gatti, E. Monari, G. Poli and E. Galli	921
Filling of Post-Extraction Dental Socket with Hydroxyapatite Granules APAFILL-G™ D. García, L. García, M.P. Pérez, M. Suarez, J.A. Delgado, R. García, Y. Rodríguez, I. Fernández and D. Márquez	925
ZrO₂-TZB in Dentistry - Material, Properties and Applications W. Weber and W. Rieger	929
Apical Canal Sealing Ability of Tetracalcium Phosphate / Dicalcium Phosphate Cements M. Yoshikawa, Y. Mandai, Y. Hiraoka, T. Toda and H. Oonishi	933
Bioactive Glass in Frontal Sinus and Skull Bone Defect Obliteration M. Peltola, K. Aitasalo, J. Suonpää and A. Yli-Urpo	937
Bone Formation by Distraction Clinical and Structural Studies M. Mattioli-Belmonte, M. Fini, F. Gabbanelli, N. Nicoli-Aldini, E. Galliani, A. Bianchi, A. Bigi, R. Cocchi, N. Roveri, S. Svegliati-Baroni and G. Biagini	941
Bone Graft Substitutes for Acetabular Reconstruction in Revision Total Hip Arthroplasty R.P. Pitto	947
Glass Ionomer as a Potential Osteoconductive Expander of Allograft in Revision Arthroplasty of the Hip J.D.J. Eldridge, J.L. Cunningham, A. Samuels, T.J. Lawes, I.D. Learmonth and A.E. Goodship	951
Ceramic Prostheses for the Radial Head Fractures B. Martinelli, R. Valentini, A. Nataloni, R. Martinetti and A. Ravaglioli	955

Comparison of Surface Morphology in Sol-Gel Treated Coralline Hydroxyapatite Structures for Implant Purposes	
B. Ben-Nissan, J.J. Russell, J. Hu, A. Milev, D. Green, R. Vago, W. Walsh and R.M. Conway	959
Hydroxyapatite-Tricalcium Phosphate as a Filler for Resected Bone Tumors or Bone Cysts of the Upper Extremity and Hand	
K. Suzuki	963
Long Term Clinical Results of Total Joint Replacement with Alumina/Alumina Articulation	
L. Sedel, P. Bizot, R. Nizard, M. Hammadouche and D. Hannouche	969
Metal-on-Metal Articulation in Total Hip Arthroplasty	
P.G. Marchetti, R. Binazzi, V. Vaccari, A. Manca, R. Rossi, A. Campagna, M. Magnani, M. Baldarelli and E. Pasini	975
Outcome of Modular Press-Fit Acetabular Components in Total Hip Arthroplasty - A Comparative Clinical Trial Using Polyethylene and Alumina Liners	
R.P. Pitto, D. Schwämmlein and M. Schramm	979
Total Hip Prostheses with Cup and Ball in Ceramic and Metal Sockets	
P. Gardelin, J.P. Seminario, C. Corradini and J. Fenollosa Gomez	983
Ceramic on Ceramic Couplings - Twenty Years' Experience	
G. Gualtieri, P. Calderoni, A. Ferruzzi, S. Gnudi, P. Frontali, F. Calista and I. Gualtieri	989
Comparison of Ceramic on Ceramic to Ceramic on Polyethylene Total Hip Replacement	
B.R. Roy, A.B. Nevelös, E. Ingham, D.L. Shaw and J. Fisher	991
Histological and Ultrastructural Analysis of Alumina Wear Debris	
E.D. Santis, G. Maccauro, L. Proietti, G. Falcone and V. De Santis	995
3 to 18 Year Clinical Results of Total Knee Replacement with Ceramic Components	
H. Oonishi, N. Murata, M. Saito, S. Wakitani, K. Imoto, S. Kin, Y. Chen, H. Nakaya, M. Tanaka and H. Amino	999
HA as a Fixation Agent for Proximal Femoral Prostheses	
M.A.R. Freeman	1005
Prognostic Factors in Lower Limb Joint Arthroplasty	
S. Giannini, F. Catani, A. Ensini, G. Cucca, L. Bragonzoni and S. Toksvig-Larsen	1007
Furlong Hydroxyapatite Coated Hip Prosthesis Versus the Charnley Cemented Hip Prosthesis - A Prospective Randomised Study	
J.G. Bradley, C.M. Andrews, K. Lee, C.A. Scott and D. Shaw	1013
Long Term Results with a Fully HA-Coated Prosthesis - Results, Lessons, and Comments from the Series Performed by the ARTRO Group (15-Year Experience)	
J. Vidalain	1021
Ceramic-Ceramic Surface Revision Surgery. Twenty Years of Experience.	
D. Rueda and F. Barahona	1025
9 to 11 Year Clinical Results of Interface Bioactive Bone Cement by Interposing Hydroxyapatite Fine Granules between Bone and Bone Cement	
H. Oonishi, N. Murata, M. Saito, S. Wakitani, K. Imoto, S. Kim, S. Sakamoto, Y. Chen, H. Nakaya and M. Tanaka	1031
Hydroxyapatite-Coated Pins Dramatically Improve the Strength of Fixation	
A. Moroni, C. Faldini, F. Vannini, V. Stigliano and S. Giannini	1037
Use of a Mineral Bone Substitute in Tibial Plateau Fractures	
E. Betti, M. Accorsini, F. Calderazzi and M. Aliani	1043
The Use of Synthetic Bone Substitutes in Total Hip Arthroplasty Revision Surgery	
C. Schwartz, P. Frayssinet, P. Lecestre and A. Ray	1049
Repair of Large Bone Defects by Autologous Human Bone Marrow Stromal Cells	
M. Marcacci, E. Kon, R. Quarto, S.M. Kutepov, V. Mukhachev, A. Lavroukov and R. Cancedda	1053