

Bioceramics Volume 26

Selected, peer reviewed papers from the 26th Symposium and Annual Meeting of the International Society for Ceramics in Medicine (ISCM), November 6-8, 2014, Barcelona, Spain

Bearbeitet von
Mariapau Ginebra

1. Auflage 2015. Buch. 472 S. Hardcover
ISBN 978 3 03835 282 2

[Weitere Fachgebiete > Technik > Werkstoffkunde, Mechanische Technologie > Materialwissenschaft: Keramische Werkstoffe, Glas, Sonstige Werkstoffe](#)

schnell und portofrei erhältlich bei

**beck-shop.de**
DIE FACHBUCHHANDLUNG

Die Online-Fachbuchhandlung beck-shop.de ist spezialisiert auf Fachbücher, insbesondere Recht, Steuern und Wirtschaft. Im Sortiment finden Sie alle Medien (Bücher, Zeitschriften, CDs, eBooks, etc.) aller Verlage. Ergänzt wird das Programm durch Services wie Neuerscheinungsdienst oder Zusammenstellungen von Büchern zu Sonderpreisen. Der Shop führt mehr als 8 Millionen Produkte.

Table of Contents

Preface, Committees and Bioceramics Symposia

I. Biostable Ceramics and Tough Ceramics

Ceramics in THR Bearings: Behavior under Off-Normal Conditions C. Piconi, A.A. Porporati and R.M. Streicher	3
Apatite-Forming Ability of ZrO₂ Ceramics Enhanced by Sandblasting and Chemical Treatment and the Influence on Mechanical Properties M. Kolařová, A. Nežiková, J. Kamprle, J. Strnad and Z. Strnad	8
Electrophoretic Deposition of Zirconia Multilayered Constructs F. Lützke, M. Maier, A. Urbanska, R. Zehbe, C. Fleck, W.D. Müller and C. Mochales	13
Characteristics of Low Temperature Degradation Free ZTA for Artificial Joint J. Ikeda, T. Murakami, T. Shimozone, R. Watanabe, M. Iwamoto and T. Nakanishi	18

II. Glasses and Glass-Ceramics

A Comparative Investigation on a Novel Bioactive Glass Synthesized via Sol-Gel Processing S.S. Seyedmomeni, M. Naeimi, M. Raz, J. Aghazadeh Mohandesi and F. Moztařzadeh	25
Sol-Gel Synthesis and Characterization of SiO₂-CaO-P₂O₅-SrO Bioactive Glass: <i>In Vitro</i> Study S. Solgi, M. Shahrezaee, A. Zamanian, T.S. Jafarzadeh Kashi, M. Raz, K. Khoshroo and M. Tahriri	30
Combustion Synthesis of 58S Bioglass Using Sol-Gel Self-Propagating Combustion Method C.A. Bertran and O.V.M. Bueno	36
Spine-Ghost: A New Bioactive Cement for Vertebroplasty C. Vitale-Brovarone, L. Pontiroli, G. Novajra, I. Teacencu, J.C. Reis and A. Manca	43

III. Calcium Phosphates

Transparent Hydroxyapatite Obtained through Spark Plasma Sintering: Optical and Mechanical Properties L. Zhong and K.A. Khor	51
NMR Structural Characterization of Mg-Containing Nano-Apatite S. Hayakawa, T. Konishi, T. Yoshioka, E. Fujii and K. Kawabata	57
Evaluation of Sr- and/or Mg-Containing Hydroxyapatite Behavior in Simulated Body Fluid L. Stipnice, K. Salma-Ancane, A. Putnins and L. Berzina-Cimdina	61
Improving the Flexural Strength Test of Brushite Cement S. Altundal, K.A. Gross, C. Ohman and H. Engqvist	67
Biphase Calcium Phosphate: Preferential Ionic Substitutions and Crystallographic Relationships at Grain Boundaries T. Miramond, T. Rouillon and G. Daculsi	73
Fabrication of α-Tricalcium Phosphate Ceramics through Two-Step Sintering I.Y. Kim, J. Wen and C. Ohtsuki	78
Calcium Phosphate-Loaded Strips, Plugs and Putties: Physico-Chemical Properties for Osteopromotion and Ease of Surgery T. Miramond, T. Galtier, G. Daculsi and P. Borget	83
Synthesis of Peroxyapatite by Hydrothermal Processing K.A. Gross, A. Jersova and A. Viksna	88
Synthesis of Tetracalcium Phosphate at Reduced Temperatures K.A. Gross and E. Rozite	93
Effect on Drying Conditions on Amorphous Calcium Phosphate A. Brangule and K.A. Gross	99

IV. Cements

- Biocompatibility of Silver-Containing Calcium-Phosphate Cements with Anti-Bacterial Properties**
Y. Shimizu, Y. Kawanobe, T. Konishi, N. Kanzawa, M. Honda and M. Aizawa 107
- Preparation of α -Tricalcium Phosphate Powders Surface-Modified with Inositol Phosphate for Cement Fabrication**
T. Konishi, M. Honda, T. Yoshioka, S. Hayakawa and M. Aizawa 113
- The Effects of Nanoparticles of Silica and Alumina on Flow Ability and Compressive Strength of Cementitious Composites**
A.S. Khorasani, H. Nuranian, A.A. Yuzbashi, S. Moghaddas, M. Raz and M. Tahriri 119
- Effect of Particle Size on Carbonate Apatite Cement Properties Consisting of Calcite (or Vaterite) and Dicalcium Phosphate Anhydrous**
A. Cahyanto, R. Toita, K. Tsuru and K. Ishikawa 128

V. Composites and Hybrid Materials

- Bioceramic Production from Giant Purple Barnacle (*Megabalanus tintinnabulum*)**
F.N. Oktar, H. Gokce, O. Gunduz, Y.M. Sahin, D. Agaogullari, I.G. Turner, L.S. Ozyegin and B. Ben-Nissan 137
- Colour Stability of Self-Adhesive Flowable Composites before and after Storage in Water**
M. Arregui, L. Giner, M. Ferrari and M. Mercadé 143
- Preparation of a Poly(Lactic Acid)/Montmorillonite Nanocomposite**
K. Nakanishi, S. Yamagata, T. Akasaka, S. Abe, Y. Yoshida and J. Iida 151
- Microstructural and Mechanical Properties of Zirconia-Silica-Hydroxyapatite Composite for Biomedical Applications**
A. Arabaci, N. Yüksel and N. Demirkol 156
- Fabrication of Bioactive Poly(lactic acid) Composite Formed by 3D Printer**
R. Karashima, T. Yabutsuka and T. Yao 160
- Characterization and Bioactivity of Hydroxyapatite-ZrO₂ Composites with Commercial Inert Glass (CIG) Addition**
B. Bulut, N. Demirkol, Z.E. Erkmén and E.S. Kayali 166
- Fibers Obtaining and Characterization Using Poly (Lactic-co-Glycolic Acid) and Poly (Isoprene) Containing Hydroxyapatite and α TCP Calcium Phosphate by Electrospinning Method**
F.A. Vechietti, D. Marques, N.O. Muniz and L.A. Santos 173
- Dissolution Behavior of Zinc from Gel Composites Consisting of Calcium Phosphate and Alginate**
T. Uchino, Y. Negishi and K. Oguma 179
- Collagen/Polyurethane-Coated Bioactive Glass: Early Achievements towards the Modelling of Healthy and Osteoporotic Bone**
S. Caddeo, F. Baimo, A.M. Ferreira, S. Sartori, G. Novajra, G. Ciardelli and C. Vitale-Brovarone 184

VI. Nanoparticles and Nanostructured Ceramics

- Magnetic Properties of Mg_{0.4}Ca_{0.6}Fe₂O₄ Nanoparticles Synthesized by Sol-Gel Method for Hyperthermia Treatment**
A.M. Escamilla-Pérez, D.A. Cortés-Hernández, J.M. Almanza-Robles, D. Mantovani and P. Chevallier 193
- Physico-Chemical Characteristics of TiO₂ Derived Nanotube Synthesized by the Hydrothermal Process as a Bioceramic**
H. Eslami, F. Moztafzadeh, T.S. Jafarzadeh Kashi, M. Solati-Hashjin, K. Khoshroo and M. Tahriri 198
- Nanostructured Bone Grafting Substitutes Versus Autologous Cancellous Bone – An Animal Experiment in Sheep**
T. Gerber, C. Ganz, W. Götz, K. Helms, C. Harms and T. Mittlmeier 202

Sintering Behavior of Nanostructured Hydroxyapatite Ceramics J.A. Delgado, L. Morejón, J. Nascimento, K.P. Macedo, A. Antunes, M. Varella, A. Alfonso, S. Martínez and M. García-Vallès	207
H₂S Adsorption Capability of Layered Double Hydroxide Containing Transition Metal Y. Yokogawa, H. Sano, S. Namba, K. Fujii, Y. Morita, M. Hotta and Y. Doi	212
Development and Characterization of Hydroxyapatite Containing Silver by Precipitation and Immersion Methods M.F. Santos, L.C.O. Vercik, A. Vercik and E.C.S. Rigo	216

VII. Coatings, Surface Engineering and Interfaces

Chemical and Heat Treatments for Inducing Bone-Bonding Ability of Ti-6Al-4V Pedicle Screw S. Yamaguchi, K. Akeda, K. Murata, N. Takegami, M. Goto, A. Sudo, T. Matsushita and T. Kokubo	225
Fabrication of Bioactive Apatite Nuclei Precipitated Ti-15Mo-5Zr-3Al Alloy by Using Doubled Sandblasting Process T. Yabutsuka, H. Mizuno, R. Karashima and T. Yao	231
Novel Bone-Like Porous Glass Coatings on Al₂O₃ Prosthetic Substrates F. Baino, F. Tallia, G. Novajra, J. Minguella, M.A. Montealegre, F. Korkusuz and C. Vitale-Brovarone	236
Interface Function Design and Bone-Regenerative Engineering of Biomimetic Biomaterials by Supersonic Treatment Using Electrolyzed Water T. Akazawa, M. Murata, Y. Minamida, M.A. Kabir, M. Ito, A. Katayama and T. Nakajima	241
Formation of Calcium-Phosphate Coatings on Ti6Al4V Substrates by an Autocatalytic Deposition Route E.A. Aguilar-Reyes, C.A. León Patiño and B. Jacinto-Díaz	247
Effect of Poling Treatment on Piezoelectric Constant of Pulsed Laser Deposited Hydroxyapatite Thin Films T. Nishigaki and S. Hontsu	253
Evaluation of Dentin Tubule Sealing Rate Improved by Attaching Ultrathin Amorphous Calcium Phosphate Sheet N. Kato, A. Isai, E. Yamamoto, H. Nishikawa, M. Kusunoki, K. Yoshikawa, K. Yasuo, K. Yamamoto and S. Hontsu	258
A Novel Treatment for Dentine Cavities with Intraoral Laser Ablation Method Using an Er:YAG Laser E. Yamamoto, N. Kato, A. Isai, H. Nishikawa, Y. Hashimoto, K. Yoshikawa and S. Hontsu	262

VIII. Additive Manufacturing of Ceramics and Composites

Automatic Casting of Advanced Technical Ceramic Parts via Open Source High Resolution 3D Printing Machines J. Minguella, M. Villegas, B. Poll, G. Tena, J.A. Calero, M.P. Ginebra and F. Korkusuz	269
Effect of Variation of Dispersant and Fluid in the Rapid Prototyping of Alumina N.O. Muniz, F.A. Vechietti and L.A. Santos	275

IX. Scaffolds

Tailoring of Bone Scaffold Properties Using Silicate/Phosphate Glass Mixtures G. Novajra, P. Perdika, R. Pisano, F. Baino, J.R. Jones, A.R. Boccaccini, R. Detsch and C. Vitale-Brovarone	283
HA/TCP Scaffolds Coated by PLA and Gelatin: Preliminary <i>In Vitro</i> Evaluation L.R. Rodrigues, C.A. de Carvalho Zavaglia and C.B. Lombello	289
P19.CL6 Cells Cultured in Apatite-Fiber Scaffold Differentiate into Cardiomyocytes K. Yasuda, H. Ishii, M. Takahara, M. Aizawa and N. Kanzawa	295
Bio-Hybrid Scaffolds for Bone Tissue Engineering: Nano-Hydroxyapatite/Chitosan Composites B. Palazzo, D. Izzo, F. Scalera, A.N. Cancelli and F. Gervaso	300

Investigating Approaches for Three-Dimensional Printing of Hydroxyapatite Scaffolds for Bone Regeneration Z.X. Zhou, F. Buchanan, A. Lennon and N. Dunne	306
 X. Ceramics for Drug Delivery	
pH Effect on the Dissolution Behavior of the Microspheres Containing Strontium Ranelate A.P. Duarte Moreira, M.S. Sader, G.D. de Almeida Soares and M.H.M. Rocha Leão	315
Bone Substitutes as a Drug Delivery of Antibiotics C. Ganz and T. Gerber	321
Fabrication of Hydroxyapatite Microcapsule Containing Vitamin B₁₂ for Sustained-Release T. Yabutsuka, K. Iwahashi, H. Nakamura and T. Yao	326
Controlled Release of a Protein Using a Ceramic Carrier and Zinc Ions as a Novel Approach to the Treatment of Osteoporosis H. Watanabe, T. Ikoma, M. Tanaka, T. Yoshioka and J. Tanaka	332
 XI. Cell-Material Interactions	
Effect of Surface Silver Ions towards Inhibiting Bacterial Growth on Apatite E.S. Thian, P.N. Lim, B. Ho, B.Y. Tay and W. Wang	341
Multiparametric <i>In Vitro</i> Evaluation of Cytocompatibility of 1% Strontium-Containing Nanostructured Hydroxyapatite D. Reis, D. Silva, J. Côrtes, L. Hummel, E. Mavropoulos, A. Linhares and G. Alves	345
Effects of Albumin Adsorption on Cell Adhesion in Hydroxyapatite Modified Surfaces J. Côrtes, E. Mavropoulos, M. Hausen, A. Rossi and G. Alves	351
Evaluation of Commercial Latex as a Positive Control for <i>In Vitro</i> Testing of Bioceramics E.S. Lourenço, J. Côrtes, J. Costa, A. Linhares and G. Alves	357
Characterization of Human Osteoclasts on Different Bioceramics M. Nakamura, T. Hentunen, J. Vääräniemi, J. Salonen, N. Hori and K. Yamashita	363
<i>In Vitro</i> Cell Response to Protein Adhesion on Commercial β-TCP M.S. Sader, E. Mavropoulos, A.P. Moreira Duarte, M. Hausen, A.M. Costa, J. Dornelas, M.N. Tanaka, G.A. Soares and A. Rossi	367
Boron Containing Nano Hydroxyapatites (B-n-HAP) Stimulate Mesenchymal Stem Cell Adhesion, Proliferation and Differentiation E. Ciftci, S. Köse, P. Korkusuz, M. Timuçin and F. Korkusuz	373
Real-Time Evaluation of the Effects of Dexamethasone on Osteoblasts Using Dual Labeling with Fluorescent Probes H. Ohsugi, J. Hatsukawa, M. Takahara, M. Aizawa and N. Kanzawa	379
The Antimicrobial Action of Silver Halides in Calcium Phosphate D. Kalnina, K.A. Gross, P. Onufrijevs, E. Dauksta, V. Nikolajeva, Z. Stankeviciute and A. Kareiva	384
Evaluation of the Effects of Ag Ion Concentration on Osteoblast Activity S.B. Cho, G.J. Yoon, E.M. An, Y.J. Kim, T.N. Kim, H.D. Jang, J.Y. Choi and I. Noh	390
 XII. Preclinical Models: Animal Studies	
Development of Bioresorbable Calcium-Phosphate Cements Hybridized with Gelatin Particles and their <i>In Vivo</i> Evaluation Using Pig's Tibia Model K. Kiminami, K. Matsuoka, K. Nagata, T. Konishi, M. Honda, G. Hayashida, K. Nakano, M. Nagaya, H. Arimura, H. Nagashima and M. Aizawa	397
<i>In Vivo</i> Evaluation of Chelate-Setting Cement Fabricated from Hydroxyapatite Including Bone Minerals Using a Rabbit's Tibia Model M. Aizawa, Y. Chibu, K. Nagata, T. Konishi, K. Ishii, H. Funao, Y. Toyama, M. Matsumoto and M. Honda	402
<i>Ex Vivo</i> Model for Percutaneous Vertebroplasty M.T. Oliveira, S. Lucena, J. Potes, M.C. Queiroga, S. Rehman, K. Dalgarno, A. Ramos and J.C. Reis	408

Elastic Blocks: Hydrogel-Embedded Granules as Bone Grafting Substitutes F. Zaage, M. Dau, C. Ganz, B. Frerich and T. Gerber	414
A Histological and Radiological Study of Bone Formation around Porous Resorbable β-Tricalcium Phosphate Used as Bone Defect Filling M. Strnadová, T. Kučera, M.D. Cevallos Lecaro, J. Strnad, Z. Strnad and A. Nežiková	420
<i>In Vivo</i> Osteogenesis Assessment of a Tricalcium Phosphate Paste and a Tricalcium Phosphate Foam Bone Grafting Materials M.A. Lopez-Heredia, D. Barnewitz, A. Genzel, M. Stiller, F. Peters, W.D. Hübner, B. Stang, A. Kuhr and C. Knabe	426
Bone Induction in Porous HAp Block Modified by Partial Dissolution-Precipitation Technique with Supersonic Treatment in Rat Scalp M. Murata, T. Akazawa, Y. Minamida, M.A. Kabir, J. Hino, H. Nagayasu, M. Ito, M. Sakamoto and T. Nakajima	430
Poly (L-Lactic Acid) and Hydroxyapatite Scaffold for Bone Regeneration: <i>In Vivo</i> Study G.N.P. Rodriguez, L.R. Rodrigues, R.C.F. Basso, P. Kharmandayan, C.A.C. Zavaglia and M.A. D'Ávila	435

XIII. Clinical Applications

Radiographic Changes Observed in THA Cemented Sockets Using Bone Cement and Hydroxyapatite Granules J. Tamura, Y. Asada, H. Nishida, M. Oota, M. Izeki, S. Yoshida, Y. Hira and Y. Matsuda	443
Bioceramic Materials Show Reduced Pathological Biofilm Formation C. Piconi, A.C. Ionescu, A. Cochis, E. Iasi, E. Brambilla and L. Rimondini	448