The Fifth Asian-Australasian Conference on Composite Materials (ACCM-5)

Symposium on Composites in Medicine

27 - 30 November 2006, Hong Kong

Symposium Organiser and Chairman
Min Wang, PhD
Department of Mechanical Engineering
The University of Hong Kong
Pokfulam Road, Hong Kong

Updated information available at
http://web.hku.hk/~memwang/files/cm07/Biocomposites_ACCM5.pdf

Important Dates

Abstract Deadline 31 January 2006
Acceptance Notification 28 February 2006
Full-length Paper Due 30 June 2006
Early Registration 30 June 2006

Information on ACCM-5 and Conference Forms

The main website of ACCM-5 is http://www.me.ust.hk/~accm5. General information on ACCM-5 and associated forms are available from this main website. A statement that the abstract is submitted for inclusion in the special symposium on Composites in Medicine should be added to the abstract when it is submitted to the conference at accm5@ust.hk or memwang@hku.hk.
The Fifth Asian-Australasian Conference on Composite Materials (ACCM-5)

Special Symposium on Composites in Medicine

Beginning with the pioneering work in the early 1980s of using hydroxyapatite as the bioactive and reinforcing phase in high density polyethylene to produce a bone analogue for hard tissue substitution, a variety of bioactive composites consisting of bioceramics and biomedical polymers have been produced and investigated for tissue repair by various groups around the world. Biological materials are natural composites, which have served as templates for the development of these tissue-substituting materials. Bioactive composites have advantages over conventional tissue replacement materials such as metals, polymers and ceramics in that their mechanical and biological properties can be tailored in order to meet specific clinical requirements. Producing bone analogues using polymers as matrices has been extended to producing bioactive composites for tissue replacement or regeneration using metallic or ceramic matrices. The utilisation of bioactivity of bioceramic particles in composites has also led to investigations into producing new materials such as bioactive bone cements and bioactive dental materials. More recently, bioactive ceramic particles have been incorporated into biodegradable polymers to form scaffolds for potential tissue engineering applications. In separate developments over the past few decades, structural bioinert composite materials such as carbon fiber reinforced polyetheretherketone and zirconia/alumina composite have also been investigated for orthopaedic or dental applications. These materials are developed primarily to meet the mechanical requirements for tissues to be substituted. Undoubtedly, the international biomaterials community has embraced biomedical composites and more and more researchers are adopting the composite approach in developing new biomaterials.

The R & D of biomedical composites involves the application of engineering principles to solving clinical problems. This is an interdisciplinary endeavour requiring the participation of researchers from materials science and engineering, mechanical engineering, chemical engineering, biology, physiology, and clinical sciences. This special symposium will focus on the R & D of biomedical composites (of different matrices including polymers, metals, and ceramics) for applications in various fields (orthopaedics, dentistry, etc.). It will cover the manufacture, characterization, evaluation (non-biological and biological), and clinical assessment of the composites. It will provide a forum for materials scientists, bioengineers, clinical investigators, industrial partners, and regulators to interact, and it is hoped that participants will benefit greatly from such a symposium of multidisciplinary facets.
Symposium on Composites in Medicine
The Fifth Asian-Australasian Conference on Composite Materials
(ACCM-5)
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Plenary Lecture on Biomedical Composites at ACCM-5:
(November 27, 2006, 09:20~10:10)

Speaker: Dr. Serena M. Best
Co-Director of the Cambridge Centre for Medical Materials
University of Cambridge, UK
Title: “Apatite Composites: Can We Improve on Nature's Design?” (594-E)

Day 1 - Monday, 27 November

SESSION 1D: Biocomposites Special Symposium I (Room D)

Session Chairs: M.Wang (HKU, Hong Kong) & K.Friedrich (University of Kaiserslautern, Germany)

10:30~11:00 Integrated Properties of Composites for Bone Tissue Engineering (Keynote Paper)
B.Milthorpe (UNSW Asia, Australia and Singapore)

11:00~11:15 Improvements of Stiffness and Strength of Bio-Resorbable Bone Nails by the MFC-Concept (345-E)
K.Friedrich, J.Hoffmann, M.Evstatiev, Y.W.Mai and L.Ye (University of Kaiserslautern, Germany)

11:15~11:30 Poly(lactic acid) Composites Directly Molded from Lactide and Particle Fillers (122-J)
M.Funabashi, Y.Inuzuka and M.Kunioka (AIST, Japan)

11:30~11:45 Rate-Dependent Strain Generated Potentials in Ossointegrated Implant-Bone Composite (307-K)
J.H.Hong, Y.H.Park and S.O.Ko (Korea University, Korea)

11:45~12:00 Thermophysical and Mechanical Properties of β-Tricalcium Phosphate Reinforced Polyhydroxybutyrate and Polyhydroxybutyrate-co-hydroxyvalerate Composites (415-H)
Y.Liu and M.Wang (HKU, Hong Kong)
Day 1 - Monday, 27 November

SESSION 2D: Biocomposites Special Symposium II. (Room D)

Session Chairs: A.Osaka (Okayama University, Japan) & D.L.Shi (University of Cincinnati, USA)

13:30–14:00 Hydroxyapatite Hybridized with Metal Oxides for Biomedical Applications (Invited Paper)
A.Osaka, E.Fujii, K.Kawabata, H.Yoshimatsu, S.Hayakawa, K.Tsuru, C.Bonhomme, F.Babonneau (Okayama University, Japan)

14:00–14:15 Surface Functionalization of Nanotubes and Nanoparticles for Biomedical Diagnosis and Treatment (402-U)
D.L.Shi, W.Wang, J.Lian, G.K.Liu, P.He, L.M.Wang and R.C.Ewing (University of Cincinnati, USA)

14:15–14:30 A Facial One-pot Synthesis of Polysaccharide-based Nanoparticles with Carboxy Functional Groups (410-C)
H.J.Dou, K.Sun, M.H.Tang and W.H.Yang (Shanghai Jiao Tong University, China)

14:30–14:45 Biocompatibility of Near-IR Sensitive Au-based Nanoparticles As the Potential Drug Delivery Carriers (338-C)
B.Zhang, X.L.Huang, L.Ren, Q.Q.Zhang, M.C.Tan and G.M.Chow (Xiamen University, China)

14:45–15:00 Fe3O4/polyaniline Nanoparticles with Core-shell Structure and Their Inductive Heating Property in AC Magnetic Field (404-C)
D.L.Zhao, X.W.Zeng, Q.S.Zia and J.T.Tang (Beijing University of Chemical Technology, China)
Day 2 – Tuesday, 28 November

**SESSION 3D: Biocomposites Special Symposium III (Room D)**

*Session Chairs: S.Best (University of Cambridge, UK) & F.Couet (Laval University, Canada)*

10:30–11:00 The Composite Strategy for Biomaterials Development  *(Keynote Paper)*

*M.Wang (HKU, Hong Kong)*

11:00–11:15 Selective Laser Sintering of Tissue Engineering Scaffolds Using Poly(L-Lactide) Microspheres *(417-H)*

*W.Y.Zhou, S.H.Lee, M.Wang and W.L.Cheung (HKU, Hong Kong)*

11:15–11:30 Modeling of Extrusion Behavior of Biopolymer and Composites in Fused Deposition Modeling *(449-S)*


*F.Couet, N.Rajan, S.Vesentini and D.Mantovani (Laval University, Canada)*

11:45–12:00 Fabrication and Characterisation of Polymer and Composite Scaffolds Based on Polyhydroxybutyrate and Polyhydroxybutyrate-co-hydroxyvalerate *(418-H)*

*N.Sultana and M.Wang (HKU, Hong Kong)*

**SESSION 4D: Biocomposites Special Symposium IV (Room D)**

*Session Chairs: L.Qin (CUHK, Hong Kong) & C.J.Lin (Xiamen University, China)*

13:30–13:45 Electrochemically-induced Deposition of Protein and Calcium Phosphate Coating on Titanium *(498-C)*

*H.Wang, C.J.Lin, R.Hu, Q.Ye and H.J.Han (Xiamen University, China)*

13:45–14:00 Formation of Apatite Within Biodegradable Scaffolds by an Accelerated Biomimetic Process in the Shaking Condition and Flow Condition *(414-H)*

*Y.Chen, A.F.T.Mak and M.Wang (PolyU, Hong Kong)*

14:00–14:15 Hydroxyapatite Nano-particles Coating on the Pore Surface Within Poly(DL-lactic-co-glycolic acid) Scaffold *(420-H)*

*J.S.Li and A.F.T.Mak (PolyU, Hong Kong)*

14:15–14:30 Bioinspired Growth of Hydroxyapatite Nanocrystals on PLGA- (PEG- ASP)n Scaffolds Modified with Oligopeptide Derived from BMP-2 *(524-C)*

*Q.Yuan, X.D.Guo, Q.X.Zheng and D.P.Quan (Huazhong University of Science and Technology, China)*

14:30–14:45 Preparation and Biological Evaluation of Natural Nano-hydroxyapatite/chitosan Composite *(405-C)*

*Y.B.Fan, X.Y.Lü and H.Q.Lu (Southeast University, China)*

14:45–15:00 Study on a Stiffness Design Method of Femoral Prosthesis Stem using Fiber Reinforced Composites *(504-J)*

*T.Kawamura, T.Kurashiki, H.Nakai, M.Zako, N.Sugano and H.Yoshikawa (Osaka University, Japan)*
**SESSION 5D: Biocomposites Special Symposium V (Room D)**

*Session Chairs: K.Sun (Shanghai Jiao Tong University, China) & M.Wang (HKU, Hong Kong)*


*L.Qin, H.Y.Yeung, C.W.Chan and J.C.Y.Cheng (CUHK, Hong Kong)*

**15:50–16:05 Objective Quantification of Porous Structure in Orthopaedic Biomaterial Implants Using Micro Computed Tomography (409-H)**

*H.Y.Yeung, L.Qin, K.M.Lee, K.S.Leung and J.C.Y.Cheng (CUHK, Hong Kong)*


**16:20–16:35 Influence of Margin Geometry on Failure of Brittle Coatings on Compliant Substrates: Relevance to Failure of Dental Crowns (279-A)**

*T.Qasim, A.Whitton, C.Ford, M.Bush and X.Z.Hu (The University of Western Australia, Australia)*

**16:35–16:50 Performance of Miniature Hybrid Ball Bearing for High Speed Dental Handpiece Applications (412-H)**

*G.T.Y.Wan, W.Wang and P.L.Wong (CityU, Hong Kong)*
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<td>Characterization of Double Crosslinked PVA/PVP Composited Hydrogels for Lubricant Layer of Articular Cartilage (160-C)</td>
<td>Y.D.Zheng, Y.J.Wang, H.A.Yang, A.Y.Miao and X.F.Chen (University of Science and Technology Beijing, China)</td>
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<td>2</td>
<td>Biological Properties of Calcium Phosphate Cement Containing N,O-Carboxymethyl Chitosan (184-C)</td>
<td>Q.Huang and D.X.Li (Nanjing University of Technology, China)</td>
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<td>Mechanical Performance of an Animal-Based Silk/Polymer Bio-Composite (190-H)</td>
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<td>Z.Niu and L.Li (Shandong University of Technology, China)</td>
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<td>Coercivity Dependence of Inductive Heat Property of Fe₃O₄ Nanoparticles in Alternating Current Magnetic Field (403-C)</td>
<td>D.L.Zhao, H.Y.Zhao, X.W.Zeng, Q.S.Xia and J.T.Tang (Beijing University of Chemical Technology, China)</td>
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<td>Preparation and Evaluation of Self-Hardening Bone-Rehabilitative Composite with Natural Hydroxyapatite/Chitosan (406-C)</td>
<td>X.Lü, B.Zheng, N.Chen and H.Yuan (Southeast University, China)</td>
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<td>Rheological Properties of Proteinic Fiber Reinforced Poly (ε-caprolactone) Biocomposites (411-C)</td>
<td>W.Li, K.Sun and S.Y.Qiao (Shanghai Jiao Tong University, China)</td>
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<td>Synthesis and Characterization of PEG-modified ZnGd₀.₁Fe₁.₉O₄ Ferrite Nanoparticles for Interstitial Hyperthermia to Tumor (413-C)</td>
<td>A.Yao, D.Wang and W.Huang (Tongji University, China)</td>
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<td>Effects of Processing Parameters on the Morphology and Size of Electrospun PHBV Micro- and Nano-fibers (419-H)</td>
<td>H.W.Tong and M.Wang (HKU, Hong Kong)</td>
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<td>Fabrication and characterization of hydroxyapatite/Al2O3 composite biocoating on Si(100) substrate (422-C)</td>
<td>Z.J.Wu, L.P.He and Z.Z.Chen (Hunan University, China)</td>
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<td>Y.Z.Liao, Z.Feng, M.H.Xin and M.C.Li (Huaqiao University, China)</td>
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<td>J.M.Wu, M.Wang and A.Osaka (HKU, Hong Kong)</td>
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