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Program

Organized by

Shanghai Institute of Ceramics, Chinese Academy of Sciences (SIC CAS)
Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences (SIMIT CAS)

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Session Chairs **Yongfeng Mei,** Fudan University,China **Xiubo Tian,** Harbin Institute of Technology, China **Friday, October 20, 2017**	
15:45-16:10	Invited talk **Magnesium ion enriched bone allograft for large bone defect management** *Kelvin W.K. Yeung* the University of Hong Kong, Hong Kong, China
16:10-16:25	ID 41 **Antibacterial effects of titanium embedded with silver nanoparticles based on electron-transfer-induced reactive oxygen species** *Guomin Wang* City University of Hong Kong, China
16:25-16:40	ID 15 **Structure, mechanical, and antibacterial properties on DLC/Ag/DLC multilayers using PLD and IBAD technique** *Lei Dong* Tianjin Normal University;Tianjin International Joint Research Centre of Surface Technology for Energy Storage Materials,China
16:40-16:55	ID 14 **Photo-Inspired Antibacterial Activity and Wound Healing Acceleration by Ag/Ag@AgCl/ZnO Nanostructures Embedded Hydrogel** *Congyang Mao* Hubei Collaborative Innovation Center for Advanced Organic Chemical Materials, Ministry-of-Education Key Laboratory for the Green Preparation and Application of Functional Materials, Hubei Key Laboratory of Polymer Materials, School of Materials Science & Engineering, Hubei University,China
16:55-17:10	ID 21 **The structure and stress of Cu films prepared by high power pulsed magenetron sputtering (HPPMS)** *Baohua Wu* Southwest Jiaotong University,China
17:30-	**Dinner at HARVEST FESTIVAL (丰收日)**

Day 5: Saturday, October 21, 2017	
8:00-	**Leave**

Invited Talk

Magnesium Ion Enriched Bone Allograft for Large Bone Defect Management

Wenhao Wang[1,2], Hoi Man Wong[1], Paul K. Chu[3], Frankie K.L. Leung[1,2], Kenneth M.C. Cheung[1], **Kelvin W.K. Yeung**[1,2]

[1]Department of Orthopaedics and Traumatology, the University of Hong Kong, Pokfulam, Hong Kong
[2]Shenzhen Key Laboratory for Innovative Technology in Orthopaedic Trauma, the University of Hong Kong Shenzhen Hospital, Shenzhen, China
[3]Department of Physics and Materials Science, City University of Hong Kong, Kowloon, Hong Kong, China

INTRODUCTION: Bone allograft is the most widely accepted approach in treating patients suffering from large segmental bone defect regardless of the advancement of synthetic bone substitutes. However, the long-term complications of allograft application in term of delayed union and nonunion were reported due to the stringent sterilization process. Our previous studies demonstrated that the incorporation of magnesium ions (Mg^{2+}) into biomaterials could significantly promote the gene up-regulation of osteoblasts and new bone formation in animal model. Hence, our group has proposed to implant Mg^{2+} into bone allograft by using plasma ions immersion implantation and deposition (PIII&D) approach.

METHODS: The decellularization and gamma irradiation process were performed on bovine bone allograft and followed by magnesium PIII&D treatment. The surface morphology, elemental chemical and depth of the samples were examined by scanning electron microscopy (SEM), energy dispersive x-ray spectroscopy (EDS) and x-ray photoelectron spectroscopy (XPS), respectively. The cytotoxicity, cell morphology, proliferation and alkaline phosphatase (ALP) expression of magnesium-enriched bone allografts were evaluated by culturing human immortalized mesenchymal stem cells (hTMSC). The Mg PIII treated bone allografts were implanted to rats for 2 months in order to evaluate the bone regeneration ability in situ.

RESULTS and DISCUSSION: Mg composite layer on bone surface ranged from 500nm to ~800nm thick. The surface topography of bone flattened and the microstructure of collagen fibers was slightly changed after treatment. The cell viability on magnesium plasma modified allograft was significantly higher than that of the control. The ALP gene expression of hTMSCs in the group of PIII&D treated samples was highly up-regulated. The bone regeneration ability of Mg modified bone allograft implanted in animal model was significantly superior than the control after 2-month post-operation.Furthermore, the magnesium PIII&D technique has been first applied to bone allograft. This well-developed technology is able to alter the surface properties of biomaterials, while the bulk mechanical properties maintained. Hence, it is believed that the original mechanical properties of bone allograft can be maintained, while the elevated magnesium content promotes the osteogenic capability of allograft.