E-MRS 2010 Spring Meeting

Technical sessions: June 7-11, 2010
Exhibit: June 8-10, 2010
Congress Center - Place de Bordeaux - Wacken, Strasbourg, France

The exciting scientific program highlights advances in international materials research and key novel applications.

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PLENARY SESSION (Wed. afternoon - June 9)

Preliminary program

BIOMATERIALS, SENSORS & SURFACES

A From embedded sensors to sensorial materials
B Functional Biointerfaces
C Peptide-based materials: from nanostructures to applications 10
D Surface modifications of diamond and related materials

ELECTRONIC, PHOTONIC & OPTOELECTRONIC

E Frontiers of multifunctional oxides
F Wide Bandgap Cubic Semiconductors : from growth to devices
G Physics and Applications of Novel Gain Materials based on III-V-N compounds
H Post-Si CMOS electronic devices: the role of Ge and III-V materials
I Advanced Silicon Materials Research for Electronic and Photovoltaic Applications II
J Silicon-based nanophotonics
K Rare earth doped materials for optical based technologies

CARBON AND ENERGY

L Carbon -or Nitrogen-Containing Nanostructured Composite Films
M Thin Film Chalcogenide Photovoltaic Materials
N Nuclear materials IV
O Solid State Ionics: Exploring chemical and structural complexity of novel ionic conductors
P Science and Technology of Nanotubes, Nanowires and Graphene

METHODS AND PROPERTIES
Q Quantitative Electron Microscopy for Research and Industry
R Laser Processing and Diagnostics for Micro and Nano Applications
S Shape Memory Materials for Smart Systems III
T Advanced Hybrid Materials: stakes and concepts

TUTORIAL

Young Scientist Tutorial on Characterisation techniques for Thin-Film Solar Cells - Friday afternoon June 11th
2010 B: Functional biointerfaces

The symposium addresses the growing interest of materials scientists in the creation, characterization, and control of processes at functional biointerfaces, i.e., the interfaces between biomolecules, cells, tissues or complex biological systems with other materials. The aim of this symposium is to exchange information about the fundamental understanding, characterization, control and engineering of these interfaces in a thought provoking, stimulating atmosphere. This is not only because of the intellectual challenges of the exciting interdisciplinary field of materials science but also because materials scientists, physicists, chemists, biologists, engineers and medical doctors are facing more and more situations where materials are confronted with challenging biological environments. Therefore, a need exists to develop and spread knowledge in this area. The aim of this symposium is, therefore, to address the need to design, create, characterize and test functional biointerfaces and to develop structure-property relationships for these functional biointerfaces.

Hot topics to be covered by the symposium:
Subject areas of this symposium include but are not limited to: biointerfaces of medical implants; proteins, polysaccharids and other biomolecules at biointerfaces; engineered micro and nanoenvironments of cells for regenerative medicine; structuring and functionalisation of biointerfaces; molecular cell biology at biointerfaces; antimicrobial biointerfaces; biomineralization at biointerfaces; nanoparticle, nanotube and nanofibre interfaces; gene and drug delivery at biointerfaces; therapy and probes in bioenvironments; sensors and devices; pathogen detection at biointerfaces; characterization of biointerfaces including probe methods; biointerfaces in nature and bioinspired biointerfaces; computational modelling of biointerfaces.

Target groups of the symposium:
Materials scientists, physicists, chemists, biochemists, engineers, biologists, microbiologists, pharmaceutical scientists, and medical professionals from fundamental and applied research as well as from industry and clinical backgrounds.

List of invited speakers:
- David M. Lynn, University of Wisconsin-Madison, USA
- Hsiao-hua (Bruce) Yu, RIKEN Advanced Science Institute, Japan
- Raphaël Lévy, University of Liverpool, UK
- Holger Schön herr, University of Siegen, Germany
- Roy Bar-Ziv, Weizmann Institute of Science, Israel
- Xingyu Jiang, Beijing, China
- Markus Buehler, MIT, USA

Scientific committee members:
- Klaus D. Jandt
- Giovanni Marletta
- Christine Ortiz
- Alexander Bershadsky
- Kaiyong Cai

The organizers do not plan to publish proceedings for this symposium. Selected papers presented at this symposium will be invited as regular submissions (full peer-review process) to the „Advanced Biomaterials“ section of the international scientific journal "Advanced Engineering Materials" by Wiley-VCH. The deadline for on-line manuscript submission via http://mc.manuscriptcentral.com/adbi is 15 October 2010.

Symposium organizers:
Klaus D. Jandt (Main organizer)
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should be also possible to use the synthetic capabilities of living cells for the
design of new nanomaterials. In this work, we show that the common
Anabaena cyanobacteria, Klebsormidium flaccidum, Cosmarium impressum
green algae and Euglena gracilis are able to form Au metallic nanoparticles
with well-controlled size and shape. The metallic nanoparticles are synthesized
intracellularly, and naturally released in the culture medium where they are
stabilized by the exo-polysaccharides, allowing their easy recovery. The
reaction kinetics varies with the genera used.

16:20 Improvement of the Antibacterial Effect of Polytetrafluoroethylene by Long
Pulse, High Frequency Oxygen Plasma Immersion Ion Implantation
Authors : Huaiyu Wang, Dixon T. K. Kwok, Paul K. Chu Department of Physics
& Materials Science, City University of Hong Kong, Tat Chee Avenue, Kowloon,
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Resume : Polytetrafluoroethylene (PTFE), which is a commonly used medical
polymer, is attractive for its superior biological stability and other properties
as high hardness and wear resistance. In particular, PTFE is usually expanded
and serves as membrane barriers for guided tissue regeneration (GTR). GTR is
a clinical procedure used to restore the attachment apparatus of periodontal
diseased teeth. When PTFE was used as GTR membrane barriers, Oral
bacterial colonization on it may adversely affect periodontal treatment
outcomes. In this paper, a novel long pulse, high frequency O2 PIII process
described was used to modify PTFE substrates by implementing a shielded
grid in the PIII equipment without the adverse effects such as sample
overheating and charging. Both conventional short pulse, low frequency O2
PIII PTFE and O2 plasma immersion PTFE served as the positive controls, and
meanwhile the pristine PTFE was used as the negative one. Plate counting
method was performed to investigate the antibacterial properties of all the
substrates. It was obvious that PTFE substrates after long pulse, high
frequency O2 PIII exhibited the highest anti-infection effects against S. aureus
among the three. Consequently, this long pulse, high frequency O2 PIII is an
effective method to modify PTFE substrates for being used as GTR membrane
barriers.

16:20 Preparation of chitosan/hyaluronic acid bead scaffolds containing basic
fibroblast growth factor
Authors : Sang Jun Park1, Chun-Ho Kim1,*, Yong Jae Jin1, and Heung Jae
Chun2 1Lab. of Tissue Eng., Korea Institute of Radiological and Medical
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Resume : In this study, chitosan (CS)/hyaluronic acid (HyA) bead scaffolds
containing basic fibroblast growth factor (bFGF) were prepared from phase
separation process. CS and HyA (weight ratio = 9:1) were dissolved in 1%
solution of acetic acid to give 1% (w/v) solution of CS/HyA. Drops of the
CS/HyA solution were extruded manually from the syringes into Teflon 100-
well plate (home made) containing methylene chloride at room temperature.
And the 100-well plate was moved to deep-freezer (-70oC). After 3 h, the
solidified CS/HyA beads were moved to a cooled freeze-dried glass vessel for
freeze-drying. The solidified CS/HyA beads were freeze-dried at -70oC for 6 h.
The beads were washed with alcohol and deionized water, and then incubated
in aqueous solution of bFGF for impregnation of bFGF. Biocompatibility and
biodegradability of the CS/HyA bead scaffolds containing bFGF were
investigated in vitro and in vivo. Attachment and proliferation of human
dermal fibroblasts on the bead scaffolds were assessed by MTT assay (CCK-8),
scanning electron microscopy and histochemical staining. The bead scaffolds
were also implanted subcutaneously into SD rats and the bead scaffolds/tissue
constructs were assessed by histochemical staining. The prepared CS/HyA
bead scaffolds containing bFGF have potential uses in tissue engineering
application. Acknowledgements This work was supported by a grant of
KMOICE(10030064) and MEST(00333), Republic of Korea.

16:20 Structural investigation of casein micelles in thin films: A GISANS study
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