10th International Conference on Nanosciences & Nanotechnologies (NN13)

9 - 12 July 2013, Porto Palace Conference Centre & Hotel Thessaloniki, Greece

10 YEARS ANNIVERSARY

NN13

ABSTRACT BOOK

http://nnconf.physics.auth.gr
nnconf@nanotexnology.com

NANOTEXNOLOGY 2013
International Conferences & Exhibition on Nanotechnologies & Organic Electronics
6-13 July 2013, Thessaloniki, Greece
www.nanotexnology.com

PLENARY SPEAKERS (common with ISFOE13)
Andrea C. Ferrari, University of Cambridge, UK
George Hadziioannou, LCPO, CNRS, France
Buddy Ratner, UWEB, USA

KEYNOTE SPEAKERS
Ravi P. Silva, University of Surrey, UK
Ioannis Misirlis, University of Patras, Greece
Efthimios Kaxiras, Harvard University, USA
George Malliaras, EMSE, France
Rachel Segalman, University of California, USA
Paul W. M. Blom, Max Planck Inst. for Polymer Research, Germany
Raffaele Mezzenga, ETH-Zurich, Switzerland
Christian Collette, ARKEMA, France
Mark Geoghegan, University of Sheffield, UK
Ludwig Leibler, ESPCI ParisTech, France

Organizers

Supported by

NN13 Committees

Organizing Committee

S. Logothetidis, LTFN, Aristotle Uni of Thessaloniki (AUTh), **Greece** (Chair)
E. Giannelis, Dept of Materials Science and Engineering, Cornell Uni, **USA** (Co-chair)
G. Hadziioannou, LCPO, CNRS, Uni Bordeaux 1, **France**(Co-chair)
K. Komvopoulos, Dept of Mechanical Engineering, Uni of California Berkeley, **USA** (Co-chair)
Ch. Tokamanis, NanoSciences & NanoTechnologies, European Commission, Brussels, **Belgium** (Co-chair)

Local Organizing Committee

S. Logothetidis, LTFN, AUTh, **Greece** (Chair)
Th. Choli – Papadopoulou, Chemistry Dept, AUTh, **Greece** (Co-chair)
N. Frangis, Physics Dept, AUTh, **Greece** (Co-chair)
Members: Kavatzikidou P., Karamanidis S., Pappa A.- M., Tziola G., Gravalidis Ch., Georgiou D., Filipousi E., Vassiliadou S., Stylou G., Logothetidou M., Basgiouraki A., Georgaraki E., Kotziapashi Th.,Chatzidis M., Volonakis G., Laskarakis A., Kapnopoulos Ch., Pitsalidis Ch., Karagiannidis P., (Physics Dept., AUTh)

WORKSHOP 1 Committee

Silva R. P., Advanced Technology Institute, Uni of Surrey, **UK**
Kassavetis S., LTFN, Dept of Physics, AUTh, **Greece**
Dimitriadis Ch., Dept of Physics, AUTh, **Greece**
Fillon B., CEA LITEN, **France**
Malliaras G., Dept Of Bioelectronics, CMP, ENSMSE, **France**
Gioti M., LTFN, Dept of Physics, AUTh, **Greece**
Horowitz G., CNTS, **France**
Iliades A., Dept of Electrical & Computer Engineering (ECE), Uni of Maryland, **USA**
Konofaos N., Dept of Informatics, AUTh, **Greece**
Fostiropoulos K., Organic Solar Cell Group, Helmholtz Zentrum Berlin, **Germany**
Loidorikis E., Dept. of Materials Science & Eng., Uni of Ioannina, **Greece**
Tsoukalas D., IMEL, NCSR Demokritos, **Greece**
Vainos N., Dept of Materials Science, Uni of Patras & NHRF/TPCI, **Greece**
Nassiopoulou A., IMEL, NCSR Demokritos, **Greece**

WORKSHOP 2 Committee

Tsakalakos Th., School of Engineering, Rutgers Uni, **USA**
Wang C.-R., Institute of Chemistry, Chinese Academy of Sciences, **China**
Anastasiadis S., Dept of Chemistry, Uni of Crete, **Greece**
Damnjanovic M., Faculty of Physics, Uni of Belgrade, **Serbia**
Kelires P., Cyprus Uni of Technology, Limassol, Cyprus & Uni of Crete, Heraclion, **Greece**
Wedel A., Fraunhofer Institute for Applied Polymer Research, **Germany**
Patsalas P., Dept of Materials Science & Eng, Uni of Ioannina, **Greece**
Porfyrakis K., Dept of Materials, Oxford University, **UK**
Tagliaferro A., Carbon Group, Dept of Physics, Polytechnic of Turin, **Italy**
Koutsos V., School of Engineering, Uni of Endinburgh, **UK**
Tagmatarchis N., Theoretical & Physical Chemistry Institute, NHRF, **Greece**
Kavatzikidou P., LTFN, Dept of Physics, AUTh, **Greece**
Stefanidou M., Civil Engineering Dept, AUTh, **Greece**
Bizios R., Dept of Biomedical Engineering, Uni of Texas, **USA**

WORKSHOP 3 Committee

Karagkiozaki V., LTFN, Dept of Physics and AHEPA Hospital AUTh,**Greece**
Balogh L. P., Dept of Radiation Medicine, Center Roswell Park Cancer Institute, Buffalo,**USA**
Chang E., Dept of Oncology, Lombardi Comprehensive Cancer Center, Georgetown Uni,**USA**
Kousoulas G., Division of Biotechnology & Molecular Medicine, Louisiana State Uni,**USA**
Misirlis I., Lab of Biomechanics & Biomedical Engineering, Uni of Patras,**Greece**
Tanaka M., Yamagata Uni,**Japan**
Owens, R., Dept Of Bioelectronics, CMP, ENSMSE,**France**
Emmanouil-Nikoloussi E.-N., Embryology & Anthropology Lab, AHEPA, AUTh,**Greece**
Foldvari M., School of Pharmacy, Uni of Waterloo, **Canada**

Biodegradable nanoporous polymeric multi-layered films for drug delivery

A. Basgiouraki[1], V. Karagkiozaki[1], D.Fatouros[2], M.Gioti[1], P.G. Karagiannidis[1], I.Vizirianakis[2], S. Logothetidis[1]

1 Nanomedicine Group, Lab for "Thin Films -Nanosystems & Nanometrology", Department of Physics, Aristotle University of Thessaloniki, GR-54124, Greece

2 School of Pharmacy, AUTh, Greece

Controlled drug delivery systems have become an area of intense research. Biodegradable polymers are widely used as coatings in implants for sustained drug release.

In this study, biodegradable nanoporous polymeric coatings have been developed by spin coating in the form of a single layer and multi layers. Particularly the biodegradable nanoporous platform was synthesized by a) a blend of poly-ε-captolactone (PCL) and poly (DL-lactide-co-glycolide) (PLGA $_{75:25}$), b) PCL and PLGA $_{75:25}$, PLGA $_{65:35}$ with different degradation rates in a triple-layer configuration, c) PCL, PLGA $_{75:25}$, PLGA $_{65:35}$ and Poly(vinyl) alcohol (PVA) in a quatern-layer configuration. Dipyridamole and Dexamethasone were used as models for drug release kinetics. Dipyridamole, an adenosine reuptake platelet inhibitor, was loaded in the outer and middle layer of the platform in different concentrations (DPM:PLGA: 1:3 and 1:2 w/w),whereas Dexamethasone, a steroidal anti-inflammatory drug, was loaded in the outer layer of the platform in different concentrations (DXM:PLGA: 1:3 and 1:2 w/w). Drug release kinetics were studied in vitro after the platform incubation in PBS at 37°C over 70days. Atomic Force Microscopy (AFM) & Spectroscopic Ellipsometry (SE) were applied for the morphological, structural and optical characterization of the samples.

It was found that the porosity and the drug release rate were both dependent on the position (i.e., outer or inner layer) as well as the concentration of each drug. These results indicate that these platforms can be used to achieve alterations in the porosity and the drug release rate, according to the requirements of each application. Hence, the above systems have the potential to be applied as coatings with sustained drug release profiles, for biomedical implants

Silica Nanoparticles as Carriers of Ascorbic Acid Particles

A. Šukajevs[1], I. Rashal[2], M. Romanova[1], Yu. Dekhtyar[1]

[1] Riga Technical University, Institute of Biomedical Engineering and Nanotechnologies, Ezermalas 6k-248, Riga LV-1006, Latvia; [2] University of Latvia, Department of Molecular Biology, Riga, Latvia

Silica (SiO_2) nanoparticles are known for their ability to attach different types of other particles and carry them to target destinations. Application of commercial SiO_2 nanoparticles as a carrier of ascorbic acid particles was studied. The size of SiO_2 nanoparticles was 10-20 nm.Ascorbic acid (AA) plays an important role in physiological processes in plants: growth, metabolism and adaptation (Y. Zhang, 2013). The role of SiO_2 nanoparticles was to attach lots of AA particles and thus ensure greater consumption of AA by a plant during its growth. Adherence of AA particles to SiO_2 nanoparticles was studied using spectrophotometry measurements. Comparison of the experimentally measured and theoretically calculated optical absorbance spectra showed that AA + SiO_2 complexes were formed when SiO_2 and AA particles were mixed in triple distilled water. The complexes remained stable at least during 24 hours.Influence of the AA + SiO_2 complexes on flax plant ('Blue di Riga') callus cell cultures was studied. Callus cultures are unorganized plant cells that grow and divide, forming clusters of cells. Callus cultures are widely used in research related to the study of the influence of various substances on the cells, as the impact of these substances on callus cells can be observed easily. Number of regeneration areas was counted after 3, 4 and 5 weeks of callus culture cultivation in the growth medium. Regeneration areas are accumulation of cells where plant regeneration occurs later. Student's t-test showed statistically significant difference between the control groups and the groups cultivated using AA + SiO_2 complexes.

Results suggest that use of SiO_2 nanoparticles in combination with ascorbic acid particles improve plant vegetation by increasing number of regeneration areas of callus tissue and increasing callus size