



E-MRS 2011 Spring Meeting

Bilateral Energy Conference
Acropolis Congress Center
Nice, France

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ICAM



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Spring 11 P: Bioinspired and biointegrated materials as new frontiers nanomaterials II

This symposium, the second one after the first European and International Conference as E-MRS Spring Meeting Symposium M "Bioinspired and Biointegrated Materials as New Frontiers Nanomaterials" 2009, is aimed to give an overview of the development of multifunctional applications in the area of Bioinspired and Biointegrated Materials in all human activities for the twenty-first century. These nanomaterials in question are mimetic materials (therefore termed 'bioinspired' – synthesizing of bioanalogs with biological templating or not), the term 'biointegrated materials', as used here, refers to inorganic or organic materials organized by biomolecules. Such nanomaterials exhibit biological properties, in several cases superior to what can be found in nature. This is a newest field which is expected to rapidly grow further.

This symposium will cover the frontiers on the modelling, simulation, synthesis, engineering, and multifunctional applications (nanomedicine, bio-mechanics, -sensors, -photonics, -electronics, and -informatics) of Bioinspired and Biointegrated Nanomaterials and based on ones Nanostructures.

Starting from well-known biological structures, such as the complex structures with high toughness (biominerals like diatom and sponge silica, seashells and bone) and the structures with hierarchical organization and high mechanical strength (as organic fibers like spider silk), scientists and engineers develop design principles for novel nanomaterials with superior properties, using biomimetic and bioguided synthesis and nanotechnologies. The design and engineering of these materials are aimed at obtaining properties that respond to external, biologically compatible stimuli (physical, chemical, or biological) and can be integrated into active electronic, photonic, and magnetic nanosystems. This symposium will include sessions ranging from computational modelling, engineering of multifunctional biointerfaces and biotemplating, to nanoscience and applications. A specific focus will be given to biomedical applications at biointerfaces in cell and tissue engineering, sensing, and diagnosis.

This symposium aims to bring researchers from biosciences, biomedicine, chemistry, physics, and materials science, as well as the engineering disciplines of electronic, photonic, magnetic nanosystems and informatics together to discuss the latest advancement in the understanding of properties, and biosynthetic mechanisms of nanomaterials, as well as the use of biological or their synthetic analogs for the synthesis of nanomaterials with controlled structures and functionalities.

09:40

MODELLING THE ELECTRIC FIELD EFFECT ON ELECTRON TRANSFER IN SINGLE- AND DOUBLE-STRANDED DNA MOLECULES

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Resume : DNA is a material that has the potential to be used in nanoelectronic devices as an active component. However, the electron transfer through DNA molecules responsible for its conducting behaviour remains controversial. Here we use a self-consistent quantum molecular dynamics method to study the effect of an applied electric field on electron transfer along single and double-stranded DNA molecules with both A- and B-form. Our results have shown that electron transfer through two isolated single-stranded molecules of poly(C) and poly(G) or poly(A) and poly(T), induced by the applied electric field along the molecular axis, is slightly larger than the corresponding double-stranded molecules, the effect being more evident for the B-form.

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