Dans le cadre des Séminaires "Nano & Micro-envirmonments for Cell Biology",
nous avons le plaisir de vous convier au séminaire donné (en anglais) par :

Gero DECHER

Professeur de l'Université de Strasbourg
Institut Charles Sadron

Mercredi 7 Mars 2012, à 16^{h}

Il présentera un séminaire intitulé :

Layer-by-Layer Assembled Nanoscale Materials

Amphithéâtre M01
Ecole Grenoble INP Phelma - site MINATEC
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Layer-by-Layer Assembled Nanoscale Materials

Since about 1990 we are developing the so-called layer-by-layer (LbL) assembly method. This self-assembly method is a bottom-up approach highly suited for the fabrication of nano-organized multimaterial films. It is based on the concept of multiple weak intermolecular interactions, that are mostly electrostatic in nature and combines experimental ease with low cost fabrication and environmental friendliness. Due to the broad range of materials that can be put into multilayers on substrates of almost every shape and every size, it has developed during the last 20 years from a scientific curiosity in fundamental research to an enabling technology, which is in the process of being transformed into a tool for commercial mass production. A large number of independent teams have developed individual research topics based on this method and are publishing now about 1000 articles per year in this field. LbL-films are used to coat objects as small as nanoparticles, as big as cars or as irregular as textiles or fruit. A huge advantage of LbL-assembly is that even films on very different surfaces can be astonishingly similar if prepared at identical deposition conditions. This allows for example to deposit films on surfaces that are difficult to characterize (e.g. paper, textile, fruit, ...) and to learn about their structure by doing x-ray or neutron reflectometry on regular silicon wafers.

Due to its general applicability to organic, polymeric inorganic and biological materials and due to its simplicity our nanofabrication process has prompted applied research in domains such as tissue engineering, functionalization of implants, gene delivery and transfection, biosensing, biocatalysis, electroluminescent devices, lithium-ion-batteries, transparent electrodes, non-linear optics, anti-reflective, fire retardant and anti-fogging coatings, corrosion protection, photocatalysis, microreactors, gas and liquid separation, functionalization of nanoparticles, controlled drug release and quite a few others.

This wealth of different potential applications is due to the fact that layer-by-layer assembly can be used with an unprecedented choice of different components and that even films with complex functionality/architecture are easily prepared using a single process that can be adapted to a large variety of surfaces.

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