instituto imdea nanociencia

seminars

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Nanociencia y Nanotecnología: lo pequeño es diferente

Nanoscience and Nanotechnology: small is different

seminar

Thursday April 10th

c/ Faraday, 9
Sala de Conferencias, Hall
Imdea Nanociencia
Ciudad Universitaria de Cantoblanco

12.00h Electronic states at donor-acceptor/ metal interfaces probed with electron spectroscopies: NEXAFS, XPS and UPS

Dr. J. Enrique Ortega
Departamento de Física Aplicada I, UPV/EHU, San Sebastián,
Centro de Física de Materiales (CFM), (CSIC-UPV/EHU), San Sebastián,
Donostia International Physics Center (DIPC), San Sebastián

The active interface in charge injection devices is often defined by a monolayer-thick blend of donor and acceptor molecules in contact with a metal surface. We have explored electronic states of such hetero-interfaces using high-resolution core-level photoemission (XPS), near-edge X-ray absorption (NEXAFS), and valence band photoemission (UPS) spectroscopies. A thorough analysis is carried out using Au(111), Ag(111) and Cu(111) surfaces, onto which pentacene (PEN) and copper phthalocyanine (CuPc) are mixed with their fluorinated counterparts F16CuPc and PFP, respectively. We analyze in detail the variations in all spectral features as a function of the donor/acceptor ratio, revealing subtle binding energy shifts in core-levels and changes in HOMO/LUMO filling. The systematic exploration allows us to correlate all observations, thereby offering important clues to predict energy barriers for electron/hole injection/extraction in such hybrid interfaces.

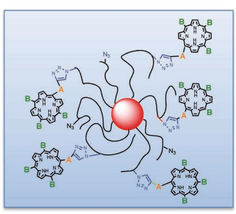
15.00h Porphyrins design for biological applications

Dr. Stephanie Lhez
Laboratoire de Chimie des Substances Naturelles,
Universit de Limoges, France

The porphyrinic derivatives are omnipresent in nature as major biological pigments. They play key roles in a variety of processes ranging from the oxygen transport by hemoglobin and myoglobin to oxidations catalyzed by cytochrome P-450 enzymes and bacterial photosynthesis. Since the discovery of these pigments, chemists, biologists but also medical professionals and material scientists have devoted pronounced efforts in order to develop synthetic methods and discover useful applications for these compounds. Indeed, for example, they also have attractive photo physical properties and could lead to the production of singlet oxygen, a very toxic species. This feature allows their application in optical imaging of diseased tissue, photodynamic therapy of tumors and photodynamic inactivation of microbial infections for example.

Since its creation in 1990, the LCSN has devoted much effort in the design and synthesis of highly structured artificial porphyrin rings for essentially biological and catalysis applications. Here will be presented some examples of biological applications such as photodynamic therapy against cancer, antimicrobial activity and effect of hydro soluble porphyrins on tobacco cells.

Grafted iron oxide nanoparticles



Irradiation of photosensitizers (PS) in tobacco cells

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