



ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 12 November 2009
17:00-18:00

3rd Floor Seminar Room

*“Spectroscopic Interface studies and thin film analysis
of microelectronic materials”*

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Abstract

Surface and interface analysis is of primary importance in both fundamental and applied research in the field of Materials Science and Technology. Many technologically important phenomena and processes are intimately related with the structure and electronic properties of surfaces and interfaces. Heterogeneous catalysis, electronic phenomena at semiconductor surfaces and interfaces, behavior of polymers and colloids, corrosion of metals and alloys, thermionic emission, solar energy conversion, polymer and biomaterial interaction with surfaces are a few examples. There exist a large number of surface sensitive techniques for surface specific chemical analysis, surface structure determination and electronic structure investigations, which are usually combined in a single experimental system in order to provide full characterization of the studied system. A general introduction on the general principles of these techniques will be presented and two of the most common surface sensitive techniques, X-ray and Ultra-violet Photoelectron spectroscopy (XPS,UPS), will be described in more detail. There are two principal ways of applying these techniques in order to provide useful information for microelectronic materials and device characterization. The first approach involves direct surface analysis and/or depth profiling on specimens provided by their manufacturers. The second approach is to create in situ, under model, controlled conditions the desired systems for analysis and characterization. Two case studies will thus be presented: (1) The characterization of high-k oxide thin films on Si substrates, and (2) A model study of in situ grown organic/inorganic interfaces, which is relevant for organic electronics applications.