



ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 5 March 2009
17:00-18:00

3rd Floor Seminar Room

***"Transparent Conductive Oxides in the post-Si
Electronics Era"***

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On the dawn of the post-Si electronics era with the emergence of Transparent Electronic devices, the role of Transparent Conductive Oxides (TCOs) is catalytic. The backbone of the current microelectronics industry are components based on silicon semiconductors: Modern data processing and telecommunications almost exclusively relies on the use of these single crystalline materials, therefore large sectors of global industry are engaged in their production, further processing and application. However, the perspectives for further developments are limited since the constraints of the material such as non availability for flexible devices, optical opacity and need for high temperature processing are obvious. The emerging class of oxide semiconductors is able to overcome many of those restrictions, especially because some of them can be prepared as thin (transparent) films under comparatively moderate conditions.

TCOs constitute an unusual class of materials possessing two physical properties-high optical transparency and high electrical conductivity- that are generally considered to be mutually exclusive. These unique characteristics combined with modern low temperature processing and low cost are already attracting the interest of major consumer electronics manufactures exploiting the advances made with the demonstration of the first "paper transistor" and p-TCO devices

An overview of two of the most common TCO materials -InOx and ZnOx- and their compounds will be presented with respect of their optical, structural and electronic properties leading to a discussion on recent developments and future trends in the fields of gas sensing, photocatalysis, electrochromics and electronic devices (PVs, PCs, TFTs).