



ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUMThursday, 11 March 2010
17:00-18:003rd Floor Seminar Room**"Molecular electronic devices based on inorganic polyoxometalates"**

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Abstract

We investigate the possibility to use molecules in the class of inorganic polyoxometalates as active components of hybrid electronic devices such as memories and transistors. Polyoxometalates (POMs) are inorganic metal-oxygen clusters that combine both the electron transport properties of the organic molecules with the charge confinement properties of the inorganic nanoclusters. These molecules were selected because of their unique redox, photochemical and catalytic properties. They can accept several electrons without significant alteration of their chemical structure thus behaving like a "point semiconductor". We have used these molecules either (a) embedded in polymeric matrices or (b) ordered layer-by-layer on a surface. A molecular memory suitable for organic electronic applications as well as a planar field effect transistor based on the control of the percolation threshold will be presented and discussed.

1. "Polyoxometalates: Building Blocks for Functional Nanoscale Systems" , De-Liang Long, Ryo Tsunashima, and Leroy Cronin , *Angew. Chem. Int. Ed.* 49, 2 – 25 (2010)
2. "Molecular storage elements for proton memory devices" Kapetanakis, E., Douvas, A. M., Velessiotis, D., Makarona, E., Argitis, P., Glezos, N., et al. (2008). *Advanced Materials*, 20(23), 4568-4574 (2008)
3. Polyoxometalate-based layered structures for charge transport control in molecular devices" Douvas, A.M. , Makarona, E. , Glezos, N. , Argitis, P.a , Mielczarski, J.A. , Mielczarski, E. " *ACS Nano*, 2 (4), pp. 733-742 (2008)