



## Anuncio de Conferencia

### “Synthesis and Applications of Two-dimensional Materials and Heterostructures”

Facultad de Ciencias (Paseo Senda del Rey, 9)  
Salón de Actos (Planta Baja)  
Viernes, 22 de junio a las 11:30 horas

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#### Abstract

Nanomaterials, generally defined as below 100 nm size in at least one dimension, can exhibit unique and remarkable properties inherent to their low dimensionality. This makes them often considered as building blocks for new powerful and (multi-)functional devices. Bearing this in mind as a connecting thread, two different topics will be discussed in this talk. On one hand, the synthesis and potential applications of two-dimensional materials – with one-atom thickness – as ultra-thin coatings for corrosion protection of metals or alloys, including two particular approaches:

- i) the use of in-situ electrochemical atomic force microscopy to study the interface between a two-dimensional material coating and the coated item during electrochemical reactions.
- ii) the use of confocal Raman spectroscopy to follow the oxidation reaction in real time corrosion.

On the other hand, I will show how to build three-dimensional materials up from two-dimensional ones. In this case, I will discuss on the fabrication of self-standing carbon nanotube (CNT) sponges through the chemical vapor deposition technique. These sponges can be used to effectively purify water from oil contaminants, or to selectively uptake a significant mass of toxic organic solvent from water (i.e. o-dichlorobenzene) about 3.5 times higher than that absorbed by individual CNTs (i.e., by CNTs in powder form). Once the sponges become saturated with oil/chemicals, they can be recycled since the absorbed material can be easily removed either by mechanical squeezing or by igniting the sponge. Moreover, application of CNT sponges as pressure-sensors, taking advantage of the compression-induced changes in their conductivity properties, will be also discussed.