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Seminario su

Low dimensional C-based nanostructures at Ag(110)

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Graphene-based nanostructures and 2D carbon-based networks are at the forefront of research for the possibility to control their electronic and chemical properties by acting on their size/morphology and by suitably doping them [1]. Therefore, they are considered a promising and low-cost substitute of metal-based catalysts in several reactions of environmental interest.

I will revise our recent results in this field, obtained by combining scanning tunnelling microscopy and X-ray photoemission spectroscopy analysis with ab-initio modelling.

In the first part of my talk, I'll report on the synthesis and characterization of C-based 1D nanostructures on Ag(110), focussing on the role of the aromatic precursor molecule to obtain nanostructures with the desired properties [2,3]. I'll also discuss the stability of these nanostructures towards atmospheric gases, showing that, in case of graphene nanoribbons, oxygen exposure deeply affects the overall system by interacting both with the nanoribbons and with the substrate. This factor must be considered for use under operative conditions. [4].

Eventually, I'll focus on the self-assembly of a Pd-cyclometallated compound on the same Ag surface, with the aim of producing a matrix in which isolated metal atoms are naturally embedded in a C-matrix and may exhibit peculiar catalytic properties. Our data indicate complex surface chemistry, with Ag(110) promoting the dissociation of the precursor molecule, the formation of two fragments and the diffusion of the Pd atoms into the subsurface region. The final configuration is unexpected, and it opens new possibilities for this class of materials [5].

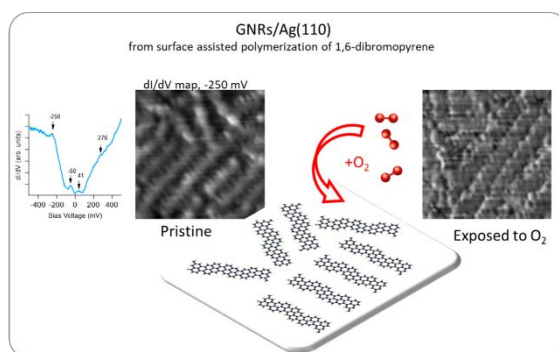


Fig.1. Effect of oxygen exposure on graphene nanoribbons on Ag(110).

References

1. C.N.R. Rao et al., *Nano Today* **2014**, 9, 324.
2. M: Smerieri, et al., *Nanoscale* **2016** 8, 17843.
3. M: Smerieri et al., *Phys.Chem.Chem.Phys.* **2018**, 20, 26161
4. J.E. Barcelon et al., *Phys. Chem. Chem. Phys.* **2021**, 23, 7926
5. M. Stojkovska et al., submitted.