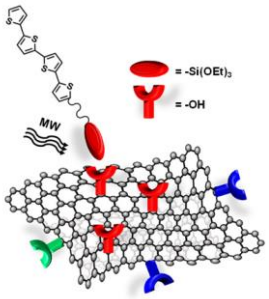
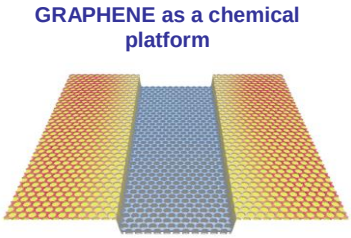
Not a molecule, not a polymer, not a substrate...
The many faces of Graphene as chemical platform.

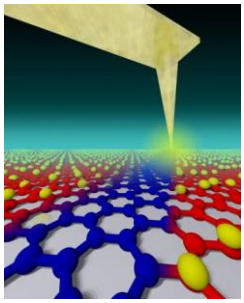
Vincenzo Palermo

ISOF – National Research Council, Bologna, Italy. Nanochemistry Lab
palermo@isof.cnr.it

What is, exactly, graphene?
While we often describe graphene with many superlative adjectives, it is difficult to force this (superlative) material within a single chemical class.
Graphene typical size is atomistic in one dimension of space, and mesoscopic in the others two. This provides graphene with several, somehow contrasting properties.
Graphene can be can be patterned, etched and coated as a substrate. Though, it can also be processed in solution and chemically functionalized, as a molecule. It could be considered a polymer, obtained by bottom-up assembly of carbon atoms, but it can be obtained from top-down exfoliation of graphite (a mineral) as well. It has not a well-defined shape like fullerenes or nanotubes; conversely, it is a large, highly anisotropic, very flexible object, which can have different shapes and be folded, rolled or bent to high extents.
In this seminar we will discuss the state of the art and possible applications of graphene in its broader sense with a particular focus on how its "chemical" properties, rather than its well-known electrical ones, can be exploited to develop original science, innovative materials and new technological applications.







(1) Xia, Z.Y.; S. Pezzini; E. Treossi; G. Giambastiani; F. Corticelli; V. Morandi; A. Zanelli; V. Bellani; V. Palermo *Advanced Functional Materials*, **2013**, DOI: 10.1002/adfm.201203686
(2) Schlierf, A.; H. Yang; E. Gebremedhn; E. Treossi; L. Ortolani; L. Chen; A. Minoia; V. Morandi; P. Samori; C. Casiraghi; D. Beljonne; V. Palermo *Nanoscale*, **2013**, *5*, 4205
(3) Palermo, V. *Chemical Communications*, **2013**, *49*, 2848
(4) Melucci, M.; M. Durso; M. Zambianchi; E. Treossi; Z.-Y. Xia; I. Manet; G. Giambastiani; L. Ortolani; V. Morandi; F. De Angelis; V. Palermo *Journal of Materials Chemistry*, **2012**, *22*, 18237
(5) Mativetsky, J.M.; A. Liscio; E. Treossi; E. Orgiu; A. Zanelli; P. Samori; V. Palermo *Journal of the American Chemical Society*, **2011**, *133*, 14320
(6) Melucci, M.; E. Treossi; L. Ortolani; G. Giambastiani; V. Morandi; P. Klar; C. Casiraghi; P. Samori; V. Palermo *Journal of Materials Chemistry*, **2010**, *20*, 9052
(7) Mativetsky, J.M.; E. Treossi; E. Orgiu; M. Melucci; V.G. P.; P. Samorì; V. Palermo *Journal of the American Chemical Society*, **2010**, *132*, 14130
(8) Treossi, E.; M. Melucci; A. Liscio; M. Gazzano; P. Samorì; V. Palermo *Journal of the American Chemical Society*, **2009**, *131*, 15576