Surface Modification of Carbon based Nanomaterials by Cyclodextrin Grafting

Giulia Neri,[1,*] Enza Fazio,[2] Angela Scala,[1] Antonino Mazzaglia,[3] and Anna Piperno[1]

[1] *Department of Chemical, Biological, Pharmaceutical and Environmental Sciences, University of Messina, V.le F. Stagno d'Alcontres 31, 98166 Messina (IT)*

[2] *Department of Mathematical and Computational Science, Physical Science and Earth Science, University of Messina, V.le F. Stagno d'Alcontres 31, 98166 Messina (IT)* [3] *Istituto per lo Studio dei Materiali Nanostrutturati, Consiglio Nazionale delle Richerche (ISMN-CNR), V.le F. Stagno d'Alcontres 31, 98166 Messina (IT)*

*Giulia Neri: giulia.neri@unime.it

In last decades, the surface functionalization of carbon based materials (i.e. pristine graphene, GO, rGO, few layers of graphene, etc), with several functional molecules such as biomolecules, drugs, metal nanoparticles, and polymers, allows to reach high performing nanohybrid systems for applications in various fields [1,2].

In particular, the chemical functionalization of graphene (G) or carbon nanotubes (CNTs) with cyclodextrins (CD) by covalent and/or not covalent approaches generates unique properties through the synergic actions of starting components. Specifically, CD units convey new properties to G or CNTs increasing the biocompatibility and colloidal stability and furnishing hydrophobic and hydrophilic recognition sites useful for applications that exploit the host/guest chemistry strategies [3,4]. In our ongoing program, aimed to the discovery of new G/CNT derivatives we investigated the synthesis, the physicochemical properties, the sensing and the biological profile of G and CNTs engineered bearing cationic CDs (Figure 1).

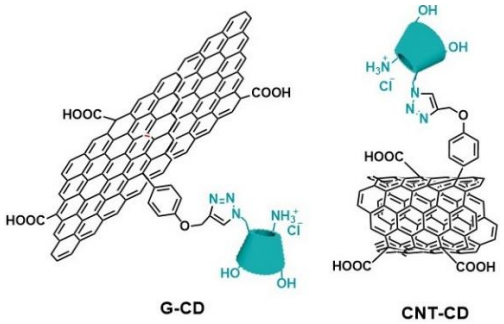

Figure 1. Chemical structures of nanohybrid systems based on G/ CNTs bearing cationic CDs.

[1] W. Liu, G.Speranza, *C*, 5 (2019) 72.

[2] D. Jariwala, V. K. Sangwan, L. J. Lauhon, et al *Chem. Soc. Rev.*, 42 (2013) 282.

[3] A. Piperno, A. Mazzaglia, A. Scala, et al *ACS Appl. Mater. Interfaces*, 11 (2019) 46101.

[4] A. Mazzaglia, A. Scala, G. Sortino, et al *Colloids and Surfaces B: Biointerfaces* 163 (2018) 55.

[5] D. Caccamo, M. Currò, R. Ientile, et al *Int. J. Mol. Sci.*, 21(2020) 4891.