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ABSTRACT:

Chemical tailoring of graphene oxide for environmental sensors, carbon capture and reutilization and water purification technologies

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Graphene and 2D materials are gaining increasing interest as multifunctional platforms for realizing devices and technologies for energy, sensing, biomedical and environmental applications. Graphene oxide (GO) is particularly suitable for property-specific tailoring through many site-specific chemical manipulations of the oxygen containing functional groups at the nanosheets surface.

In this talk, I will present selected case-studies of chemically modified GO, and their applications as active materials for water purification [1], electrochemical sensors [2] and carbocatalysis. [3]

I will describe our recent results on covalent functionalization procedures and design strategies for i) enhanced adsorption of emerging contaminants (i.e. PFAS, antibiotics) from drinking water, ii) electrochemical transduction for pesticides monitoring in water and ii) CO₂ capture and utilization in chemical transformations. Finally, the case of polymer-graphene based composites [4] for water filters technology and their transfer from lab scale to industrial production and commercialization will be presented. [5]



References

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- [3] A. Pintus, S. Mantovani, A. Kovtun, et al, *Chem. Eur. J.*, **2023**, e202202440
- [4] M. Zambianchi, S. Khaliha, A. Bianchi, et al, *J. Membr. Sci.* **2022**, 120707.
- [5] a) M. Melucci et al, PCTIB2019058300, b) M. Melucci et al, EP21207308