Graphene-based smart inks for electroanalysis.

Alessandro Silvestri, Silvia Vazques Diás, Giuseppe Misia, Fabrizio Poletti, Chiara Zanardi, Aitziber Cortajarena and Maurizio Prato.

Center for Cooperative Research in Biomaterials (CIC BiomaGUNE), Basque Research and Technology Alliance (BRTA)
Donostia-San Sebastián 20014, Spain
asilvestri@cicbiomagune.es

Originally discovered as a black pigment, carbon ink played an essential role in human civilization by helping to transmit and spread knowledge. The recent discovery of nano-structured carbon materials (e.g., fullerenes, carbon nanotubes and graphene) are enabling a new generation of programmable inks able to implement advanced functionalities far beyond color.[1] The coupling of these functional inks with modern printing technologies is revolutionizing the field of flexible electronics, and of wearable and implantable sensors and actuators.

This talk will elucidate different strategies, spacing from chemical functionalization to self-assembly and phase engineering, to achieve graphene and 2D material-based inks responsive to chemical concentrations. [2] In particular, our efforts have been focused in creating multifunctional inks able to fulfill all the requirements of an electrochemical sensor: immobilization and stabilization of the bioreceptors, recognition of the analyte, transduction, and amplification of the signal [2,3]. These smart inks were used to fully inkjet-print electrochemical paper analytic devices (e-PADS), obtaining low-cost, sustainable, and reliable platforms for electroanalysis.

References

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Figures

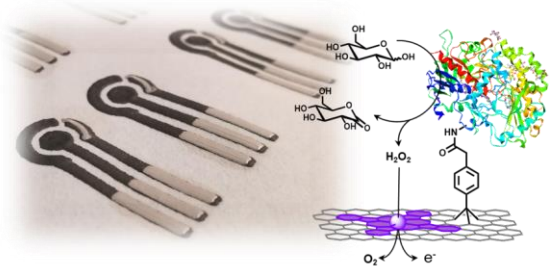

Figure 1: Electrochemical paper-based analytic devices (e-PADs), fully inkjet-printed with graphene-based smart inks.