Nanomaterial-based smart inks for electrochemical sensors

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From their origins as a simple black pigment, carbon inks have played a foundational role in transmitting human knowledge. Today, the advent of graphene and 2D materials has ushered in a new era of smart inks, offering functionalities far exceeding traditional color.[1] Integrating these advanced inks with modern printing technologies is now revolutionizing flexible electronics, as well as wearable and implantable sensors and actuators.
This presentation will detail strategies, including chemical functionalization, self-assembly, and phase engineering, for developing graphene and 2D material-based inks highly responsive to specific chemical concentrations. [2,3] Our work specifically aims to create multifunctional inks capable of fulfilling every aspect of an electrochemical sensor: from bioreceptor immobilization and stabilization, through analyte recognition and transduction, to signal amplification. [2,3] Ultimately, these smart inks enable the fabrication of entirely inkjet-printed electrochemical paper analytic devices (e-PADs), providing a pathway to low-cost, sustainable, and reliable electroanalytical platforms. [4]

References

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