

Abstract

# Potentiometry, Nanostructured Materials and the Emergence of Paradigm-Shifting Analytical Platforms <sup>†</sup>

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Some of the recent social and technological trends, such as telemedicine, point of care and chemical sensing networks, are creating a growing demand for systems that can generate chemical information everywhere, in real time. Since the traditional lab-centred approaches cannot cope with the increasing levels of scale and speed required, devices that can generate information with minimal expertise and infrastructure, in real time are required. In the near future, home-based analytical devices connected to mobile phones, embedded in garments or as part of other daily use objects should become common. This is a paradigm-shifting challenge where the traditional notion of analytical performance based purely on detection features (e.g., sensitivity, selectivity, limits of detection, etc.) must be broadened to embrace also aspects such as speed, affordability, simplicity of operation, versatility and scalable manufacturing. In this presentation we will discuss recent developments to build simple, compact and ultra-low-cost analytical and bioanalytical platforms. In particular, the use of nanoporous and nanostructured systems to create new electrochemical sensing interfaces with ability to create flexible platforms for (bio) sensing will be presented. Recent advances in the development of wearable electrochemical sensors and ultra-low-cost (under 0.10€) chemical sensors with ability to measure ions, organic and biological molecules in different settings outside the lab. Examples of paper-based electrochemical sensors and sensing textiles with wireless connectivity will be shown. The ability of these novel tools become a widespread platform to tackle emerging social challenges will be discussed, and their use in real scenarios will be presented.

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