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Electronic Devices Using Biosensors or Biochemical Products

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Abstract

Smartphone has been widely integrated with sensors, like test strips, sensor chips, and hand-held detectors, for biochemical detections thanks to its portability and ubiquitous availability. Utilizing built-in function modules, smartphone is often employed as controller, analyser, and displayer for rapid, real-time, and point-of-care monitoring, which can significantly simplify design and reduce cost of the detecting systems. The favourable analytical performance along with the wearable nature of the wireless transceiver makes the new epidermal potentiometric sensing system attractive for continuous monitoring the sodium dynamics in human perspiration during diverse activities relevant to the healthcare, fitness, military, healthcare and skin-care domains.

Keywords: Smart phone • Biosensor • Optical sensing • Electrochemical sensing

Biosensosrs

Bioelectronics deals with the coupling of biological function units to electronics. Bioelectronics devices include those for biochemical sensing, information processing, as well as storage and actuating. Interfacing of biology with electronics is that the key issue and was hence taken because the subtitle of the workshop. Because of its inherent interdisciplinary approach, bioelectronics is closely linked to many other fields in materials and life sciences. The international scientific community basically agrees concerning the importance of tasks and subtasks in current research and development (R&D) of bioelectronics.

In an introduction to basic concepts, general paradigms of the evolution of biological molecular structures are treated by Kuhn in his paper "Reflections on bio systems motivating supramolecular engineering". The key-and-lock sequences leading to self-assembly of supramolecular structures in nature and the principles of programmed environmental changes are identified here as the Biosensors & Bioelectronics most promising approaches for future supramolecular engineering which aim at the event of complex bioelectronics devices. Several examples are given for strategies in supramolecular engineering by starting from crypt ate molecules and monolayers formed by the Langmuir Blodgett (LB)-technique or by chemisorption of selected molecules with functional groups exhibiting receptor properties. Monolayer assemblies that make possible the light-induced electron transfer through the layer are of particular interest in view of utilising photon-induced processes similar to those occurring in the photosynthetic reaction centre.

In this paper, we have discussed our recent development of Electronic devices using biological function with integrated electronic sensor for the potential application in the detection of biochemical within or outside of the individual live cells. We have successfully designed and fabricated the device on SOI substrate. The device performance was tested with pH solutions ranging from 2 to 12, and a sensitive pH response with 79.4 S/pH was achieved in the sensors fabricated. This report has focused on the Sensing of short electronic devices, and the studies for longer chain using biomolecules and biosensors molecules are worthy of more Investigations. Meanwhile, this report may stimulate further developments in grapheme transfer techniques as well as studies on the surface interaction between grapheme and organic polymer or biomolecules.

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