

Interdigitated gold microelectrodes integrated in microfluidic cell for biosensor applications

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Currently available methods for bacteria detection are mostly based on classical methodological approaches such as selective culture, immuno-affinity testing (like enzyme linked immunosorbent assay, ELISA) and, more recently, polymerase chain reaction (PCR). Biosensors appeared some forty years ago with the advent of the enzyme electrode. In the context of bacteria detection, biosensor development offers the possibility to perform faster, cheaper and simplified detection of multiple analytes, even in complex multicomponent matrices. Bacteriophages are the most numerous organisms in the biosphere. They are highly specific to their target bacteria and hence harmless to humans. In this work, we used lytic T4-phage immobilized on gold microelectrodes for bacteria detection. The gold microelectrodes chip was produced by standard photolithographic techniques in a clean room. Each chip featured two interdigitated gold microelectrodes, each of them consisting of 54 fingers with 10 μm wide, separated 10 μm from the nearest band. Physisorption was thus selected in this work for transducer functionalisation based on its simplicity. We used BSA (Bovin Serum Albumine) to prevented non-specific adsorption. A limit detection of 10^3 cfu/ml E.Coli bacteria was detected with a good reproductibility with impedance spectroscopy.

Biography

Adnane Abdelghani is Professor in the National Institute of Applied Science and Technology (Tunisia) working mainly on the field of Microsensors and Microsystems. He is the leader of Nanotechnology laboratory in Tunisia. He organised two interesting International Conferences in the Field of Nanotechnology in Tunisia ("Advancements in Nanotechnology and Microelectronics" 2009 and "Nanoscale Science and Technology", 2012). He supervised more than 10 Ph.D. theses in the field of gas sensors and biosensors in Tunisia and published more than 75 papers in International Journals.

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