Applying the Miniaturization technologies for biosensor design

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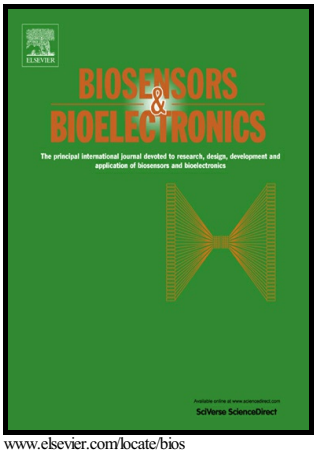

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Applying The Miniaturization Technologies for Biosensor Design

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Abstract

Microengineering technologies give us some opportunities in developing high-tech sensing systems that operate with low volumes of samples, integrates one or more laboratory functions on a single substrate, and enables automation. These millimetric sized devices can be produced for only a few dollars, which makes them promising candidates for mass-production. Besides electron beam lithography, stencil lithography, nano imprint lithography or dip pen lithography, basic photolithography is the technique which is extensively used for the design of microengineered sensing systems. This technique has some advantages such as easy-to-manufacture, do not require expensive instrumentation, and allow creation of lower micron-sized patterns. In this review, it has been focued on three different type of microengineered sensing devices which are developed using micro/nano patterning techniques, microfluidic technology, and microelectromechanics system based technology.

Keywords: Miniaturization, Microtechnology, Nanotechnology, Micropatterning, Nanopatterning, Microfluidics, MEMs

1. Introduction

As of the date of 1953, after development of the first electrode by Clark for biological purposes, biosensor technology has grown rapidly, these courses of events continue even today. Advances in biosensor technology can be investigated considering two components: The advances in biological and physical parts. To understand the growth rate, the types of biosensors can be investigated in biological manner. Following enzyme sensors, immun sensors (Yao et al., 1987, Derkus et al., 2013, Derkus et al., 2014), hormone sensors (Vijayen et al., 2015, Johansson and Hellenas, 2001), cytosensors (Wu et al., 2012, Sun et al., 2016),