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Genosensors and Related Technology

Genosensors take advantage of the specific hybridization properties of nucleic acids to characterize gene sequences, identify organisms, or determine patterns in gene expression. Selected DNA sequences can be arrayed for performing multiple hybridization experiments simultaneously. The resulting device is called a genosensor. As an alternative to DNA arrays that are prepared on flat glass substrates, such as microscope slides, we have been developing a three dimensional architecture. In this system, the probes are immobilized within individual cells of densely packed straight, smooth channels traversing a thin silicon or glass substrate. The etched silicon substrates are prepared by deep reactive ion etching and contain features on the order of ten microns. In addition to etched silicon, channel glass has been used. The porous substrates provide a unique “flowthrough” architecture that leads to an increased surface area and faster reaction kinetics. The construction and application of genosensors, as well as the development of related technology for high density arraying and detection, will be presented.

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