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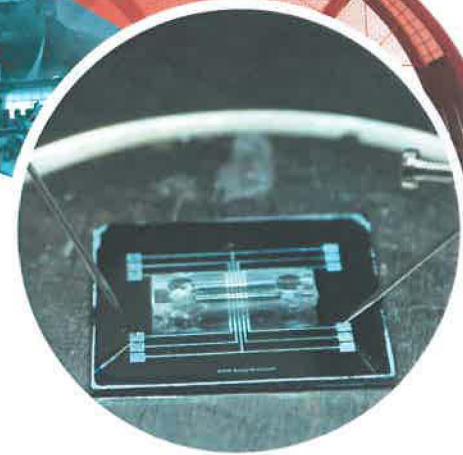
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SILICON NANOWIRES ARRAY pH SENSOR WITH INTEGRATED MICROFLUIDIC CHANNEL

Patent No.: PI20091646

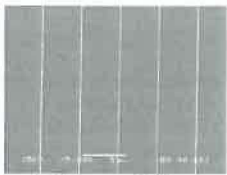


PRODUCT DESCRIPTION

Silicon nanowires based biosensors have garnered great potential in serving as a highly sensitive, label-free and real-time response biosensing application. These biosensors are useful in detecting pH, DNA molecules, proteins and even single viruses. The geometrical characteristics and performance of silicon nanowires array for pH level detection are pivotal in this invention. The smallest sizes of the fabricated silicon nanowires structure is 20 nm width and 400 μm length. A 100 μm microfluidic channel is bonded on top of the silicon nanowires to transport the pH solution. pH level detection is performed by utilizing the standard aqueous pH buffer solutions (pH 1 to pH 12) to test the electrical response of the sensor. The silicon nanowires sensor shows the highest resistance value for pH<7 and the lowest resistance value for pH>7.



Cross section view of Silicon Nanowires



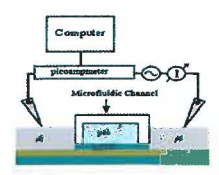
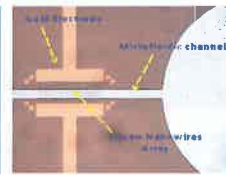
SEM image of Silicon Nanowires Array



pH buffer solutions

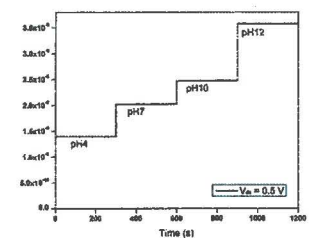
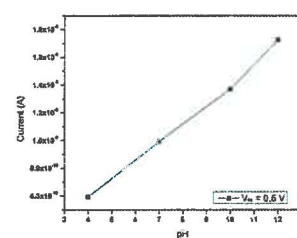
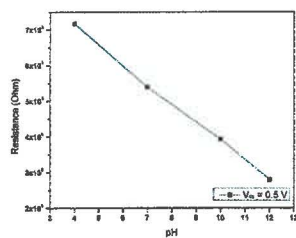
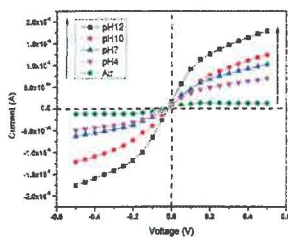


Microfluidic Channel



Electrical measurement

RESULTS



The silicon nanowires sensor shows the highest resistance value for pH<7 and the lowest resistance value for pH>7

The pH sensitivity calculated from linear relation between the drain-source current and the pH value was 0.14nA/pH

Real-time detection of the conductance for an APTES modified Silicon Nanowires for pHs

NOVELTIES

- Ultra-high sensitive and selective electrical sensor
- Rapid and multiplex electrical detection device

COMMERCIALIZATION POTENTIALS

Silicon Nanowires Array pH Sensor has great potential and applicable for:

- Biomedical Laboratories
- Industry monitoring
- Food processing
- Agriculture and Environment

PRODUCT ADVANTAGES

- Ease of handling
- Label free & real time operation
- Accurate/reliable measurement
- In-house fabrication
- Down scaling/small size