

EXPOSED SEGMENTED NANOSTRUCTURE ARRAYS

Summary

Exposed-segmented-nanostructure array (ESNA) technology is putting nanotechnology on a chip. ESNA combines the superiority of ultra-sensitive nanostructures with that of facile manufacturing. It also enables its nanostructures to have unique chemical and physical properties for a variety of sensor applications and other electrochemically-based reactions when small and powerful are desired characteristics. ESNA's are made starting from a multi-layered, plastic template on which nanostructures are grown through a series of deposition and etching processes all of which can be automated within a "roll-to-roll" manufacturing scheme. Initial evaluations have shown ESNA technology to have 30% sensitivity improvement for glucose detection compared to that of a commercialized thin film sensor technology.

Competitive Advantages

- Complete manufacturing is based upon a series of well-established components and processes
- Arrays of nanostructures have high aspect ratios and diameters of less than 10nm
- Chemical and physical properties can be tuned through the process of growing the nanostructures and for very specific applications

Problem Addressed

- Demand exists for improvement in activity/sensitivity and selectivity of sensor technology
- Organizing and utilizing nanoparticles/ structures for applications is physically challenging
- Other existing processes require high vacuum and thus have limited scalability
- Some sensor applications require miniaturization down to the nano regime

Applications

- Healthcare: continuous glucose monitoring, rapid diagnostics of diseases and pathogens, drug screening, medical research
- Homeland security and defense: Detecting explosives, chemical and biological materials and weapons
- Environment: Pollution monitoring, detecting water-borne bacteria, atmospheric trace gas detection
- Industrial health and safety: Hazardous gas detection
- Food: Detecting chemical contaminants and pathogens
- Microelectronics and IT: Characterizing nano-scale devices and features
- Nanotechnology: Characterizing nanostructures and nanomaterials

Patents

- WO 2017087770 A1
- WO 2013126885 A1

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Meet the Inventor

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