One-step synthesis of nanowire sensors

18 July 2006

Scientists in the US have discovered a way of making nanowire-based electronic biosensors in one short step.

Hsian-Rong Tseng and co-workers from the University of California, Los Angeles, have developed a method for synthesing conducting polymer nanowires (CPNWs) within a microfluidic device. The method uses electrochemical polymerization to grow the CPNWs directly into microfluidic channels. Once grown, the integrated device can be used straight away as a sensor.

Tseng says this approach is more convenient than the three-step process usually required to make nanowire sensors. Traditionally, the nanoparticles are formed, incorporated into electrodes and then the electronic and microfluidic components are integrated together.

Carbon nanotubes and CPNWs are 1D nanomaterials that can be used for the electronic detection of biological species like proteins and DNA. Their high surface-to-volume ratio and unique electron transport properties mean that their electronic conductance is very sensitive to even the smallest of surface perturbations, such as those caused by binding to a biological molecule. CPNWs make good sensing materials because of their tuneable electronic conductivity, ease of processing and flexibility.

Tseng said ‘this approach opens up new possibilities in the fabrication of high-density, individually addressable nanowires arrays for use in chemical and biological sensing’.

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References

DOI: 10.1039/b604426c

"The method uses electrochemical polymerization to grow the CPNWs directly into microfluidic channels."