MONASH University

MONASH INNOVATION

TACTILE NANOWIRE SENSOR

An electronic sensor that has the ability to distinguish between sharp and blunt objects. The novel approach we have employed uses nanowires of different lengths that give varying electronic responses when pressurised. Applications include a range of wearable sensors.

- **Distinguishes between blunt and sharp objects**
- **Flexible**
- **Strain insensitive**
- **Multiple design options**

THE CHALLENGE

Wearable sensors tend to be limited in terms of their ability to reflect complex systems. An example of such a complex system is the human ability to touch, which can simultaneously sense pressure, the location of the pressure and the shape of the object applying the pressure.

An extra layer of complexity is introduced when the sensor needs to be functional in both stretched and unstretched states. This is similar to the functional requirements of human skin.

There is a clear need to develop a sensor that can more closely imitate that of human skin.

THE SOLUTION

Monash researchers have developed a method of growing nanowires at various lengths so that when pressure is applied, the various lengths can generate an electrical impulse that corresponds with the length of the nanowires.

THE TECHNOLOGY

A number of new designs have been developed that can produce a suitable response in wearable sensor applications, as shown in Figures 1 and 2.

Nanowires are grown on a stretchable Eco-Flex substrate. The Eco-Flex is functionalised with APTMS and soaked in a solution with excess gold nanoparticles. The nanowires are grown through an interaction of a ligand, $HAuCl_4$ and an acid.

Figure 1 shows nanowires of six different lengths that are grown on an Eco-Flex substrate. The various lengths are produced by sequentially masking the subsequent regions.

A variation on this design is shown in Figure 2 where a circular disc sensor is used in a concentric layout.

INTELLECTUAL PROPERTY: This technology is protected by Australian provisional patent AU2018902448.

THE OPPORTUNITY

Monash seeks a partner to assist in the commercialisation of this technology.

Prof Wenlong Cheng who is a world leader in the development of nanowire technology heads the Monash research team responsible for this technology.

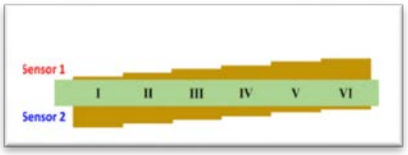

Figure 1. Nanowires grown on a substrate with sequential regions masked.

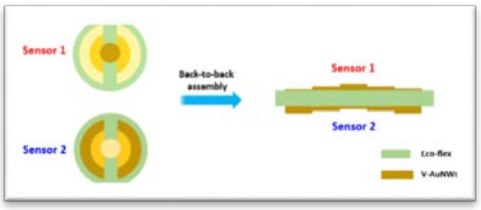

Figure 2. Circular disc sensor used in concentric layout.

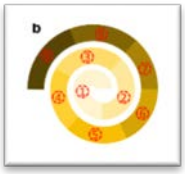

Figure 3. Spiral layout.

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