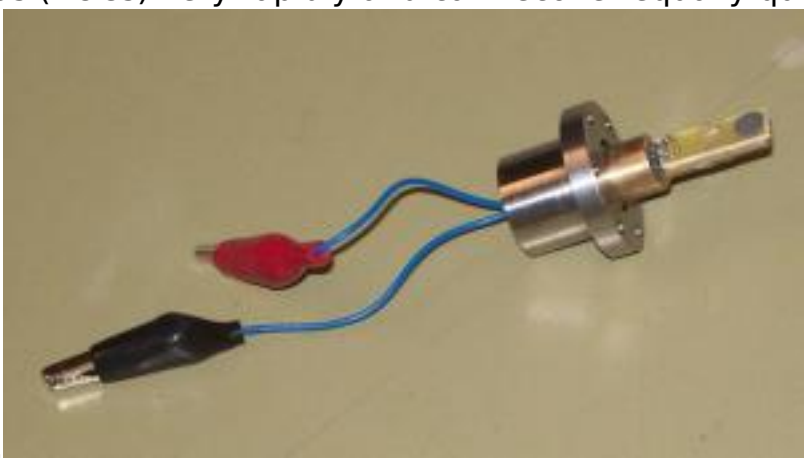
Fast-acting Electronic Nose uses QTC technology

ECN Europe

Peratech [1] is developing an Electronic Nose using its Quantum Tunnelling Composite material. This new sensor technology detects the presence of Volatile Organic Compounds (VOCs) very rapidly and can recover equally quickly, in a matter of seconds. [2]



QTC materials change their resistance when a force is applied and, in this case, the polymer content of the composite swells when exposed to VOCs. One form of Peratech's sensor uses a granular type of QTC material that provides a high surface area for absorption enabling it to detect levels of VOCs in the region of 10-100 ppm. The sensor rapidly recovers once the VOCs have gone from the surrounding atmosphere and it is the speed of sensing and recovery that marks the difference between QTC sensors and those using other sensing technologies. An additional feature of the QTC technology is that it has very low power requirements.

The conductive particles used in the QTC Electronic Nose have nano-sized features and are distributed in a non-conductive polymer. When a force is applied or swelling occurs, the particles move close enough for the electron flow between the particles to alter due to an effect called Quantum Tunnelling. The polymer used is selected for its response to the particular VOCs to be monitored.

"The electronic nose application was developed in conjunction with the Quantum Tunnelling Composite research group at the University of Durham," explained David Lussey, CTO of Peratech. "We are now looking for companies who are interested in licensing the technology from us to develop products."

Professor David Bloor, who is involved in a long-term collaboration with Peratech, added, "Quantum Tunnelling Composite is unique in the area of materials science and a team of researchers and students have been involved in the investigation of its properties. These never cease to amaze and open up different ways in which it can be used."

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