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Editorial

Sensors in Industrial Applications

Sensors are vital to process and product control across a large number of industries. A network of sensors is used for monitoring and controlling machinery, systems and processes in chemicals, pharmaceuticals, biotechnology, energy, water, wastewater, oil, gas, plastic, paper, food and beverages among others.

Technologies for Sensing

The technologies are as varied as the applications. Methods for detecting gases, elements, molecules or biological markers as well as parameters such as temperature, pressure or flow may be based on chemical, electrochemical or physical processes. In this issue, for example, electrochemical sensing is applied to improved sensing devices for health applications (1–4).

Graphene is of much interest in a variety of applications not least for its potential uses in sensing and is being explored by many academic groups as well as industry. Some of the work outlined in this issue (5) reflects this importance, as well as the continued need for improved characterisation of the material. Andrew Pollard (National Physical Laboratory (NPL), UK) was recently awarded a 'Rising Star in Industry' award from the Royal Society of Chemistry (6) for his work on graphene and flexible organic electronic devices. Andrea Ferrari (Cambridge Graphene Centre, University of Cambridge, UK) is another well-known figure in the graphene field with a number of recent publications in graphene (7, 8).

Another important area for sensing is in water treatment, where the health and wellbeing of consumers depends on reliable disinfection of the water provided to the tap. Current research at Imperial College London, UK, indicates that improvements could be made in monitoring the chlorination of water throughout the distribution system (9, 10).

The recently completed EU project CATSENSE "Design of novel high-performance catalysts and biosensors based on deposited mass-selected clusters assisted by computational theoretical screening", in which Johnson Matthey was an associated partner, brought together expertise in universities, industry and research organisations to investigate nanoparticles preparation for applications that included sensing as well as catalysis and fuel cells (11, 12).

Sensing the Future

Sensors have advanced since the patenting of the earliest electric thermostat in the 19th century (13). The so-called 'internet of things' (14) and 'industry 4.0' will only increase the need for reliable, accurate and durable sensors that are low cost, numerous and indicative and can be used for individual applications or combined into a sensor mesh network that can achieve accuracy through numbers and clever signal processing in both end consumer and industrial settings. The growing need and affordability of health care, food security and clean water, in line with United Nations Sustainable Development Goals (15), will also enhance the usefulness of sensors bringing impetus to the academic and industrial research and development groups working in these areas.

This issue offers a flavour of the latest developments in areas relevant to sensing. It is to be expected that much more will happen in this field in the coming years.

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