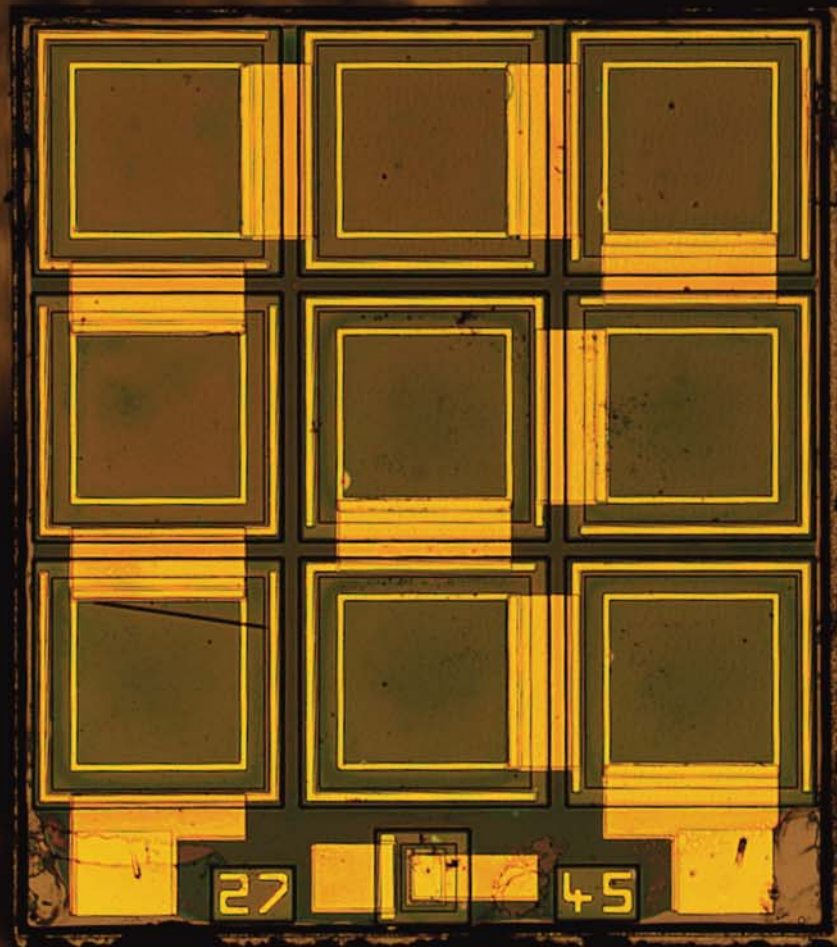




University
of Glasgow

Gas Sensing Solutions



Gas Sensing Solutions

A new generation of solid state CO₂ gas sensors developed by Gas Sensing Solutions Ltd (GSS), is seeking further enhancement in sensor performance by exploiting photonic crystal technology being developed by scientists at the University of Glasgow.

Conventional gas sensing systems used for detecting CO₂ in applications such as air conditioning systems, environmental monitoring, and horticulture tend to be hard to use, bulky and quite expensive. Another problem with the existing technology is that it consumes a lot of energy and can take several minutes to warm up before use. GSS solid state technology resolves these issues by providing a low power sensor with high volume manufacturing capability at low product costs.

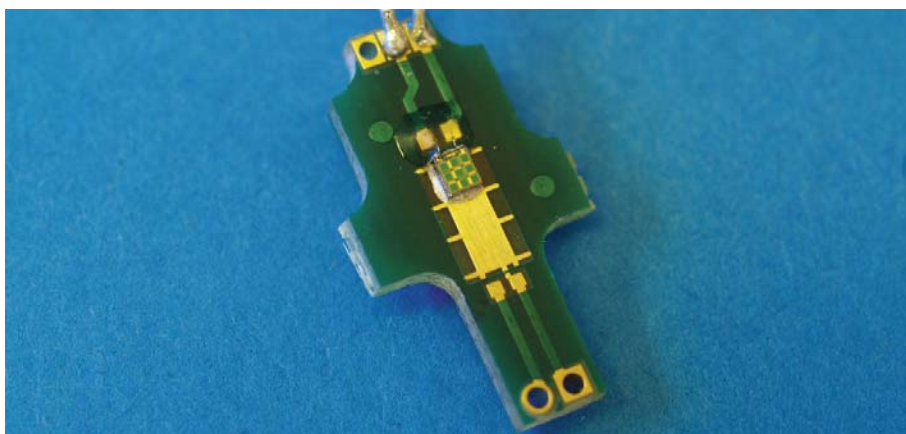
Dr Faiz Rahman, Professor Richard De La Rue and Ian Chequer of the School of Engineering are working with Scottish company GSS to apply photonic crystal technology to further enhance mid infra-red LED performance.

Dr Rahman has previously worked on photonic crystal LEDs for the visible blue region, but the device he is developing for the infra-red range will be even more effective because the photonic crystal technology is even more effective at extracting light at these longer wavelengths.

The sensors rely on mid-infrared radiation that comes from an LED to detect CO₂. The photonic crystal technology makes the LEDs appear brighter, thus improving the effectiveness of the sensors. In addition to this, there are improvements in the shape of the emitted beam which will make the sensors easier to construct.

The research is building upon technology that has been developed by GSS. This technology is dependent on generating and sensing light at 4.3 microns wavelength, absorbed by ambient CO₂. The sensors are low and aimed at high volume global markets for air quality monitoring and control in buildings and transport systems.

The devices being developed at the University offer potential to further reduce the amount of power consumed by the gas sensors by a factor of two, greatly enhancing battery life.



A CO₂ sensing device.

The worldwide market for CO₂ gas sensors is in excess of £500 million. However, the technology is also applicable to carbon monoxide and methane with market size at least equal to CO₂.

They could also be used to detect methane during oil exploration. Currently, there are cryogenic systems for detecting methane which require liquid nitrogen to operate at below room temperature and they are expensive to run. Applying the photonic crystal LEDs for this process would be cheaper, use less energy and eliminate the need for having the cooling equipment.

Professor De La Rue and Dr Rahman received £45,000 for this project through a Knowledge Transfer Account (KTA) funded by the Engineering and Physical Sciences Research Council (EPSRC).

Dr Rahman said: "Our research is an attempt to apply photonic crystal technology to a new region of the electromagnetic spectrum; enhancing the effectiveness of mid-infrared LEDs and thus enabling a new generation of gas sensing products."

Dr Des Gibson, chief executive of GSS, which is based in Cumbernauld near Glasgow, said: "The work currently being carried out by Dr Rahman utilising Glasgow University photonic crystal R & D capabilities offers potential to significantly enhance Gas Sensing Solutions' gas sensor products and open up new high growth global markets."

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