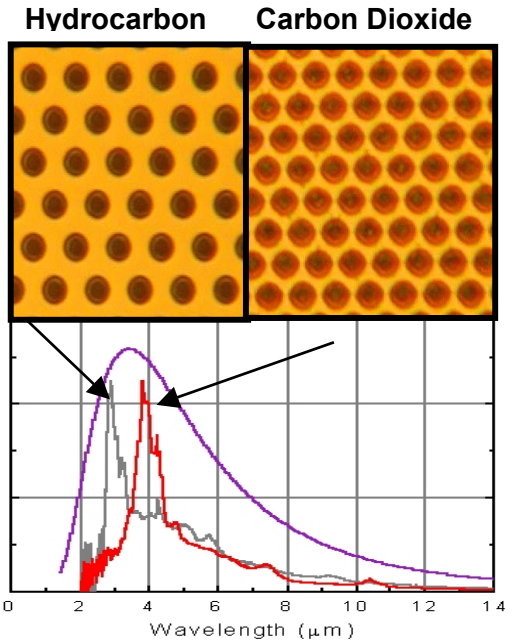
Integrated Infrared Gas SensorChip™

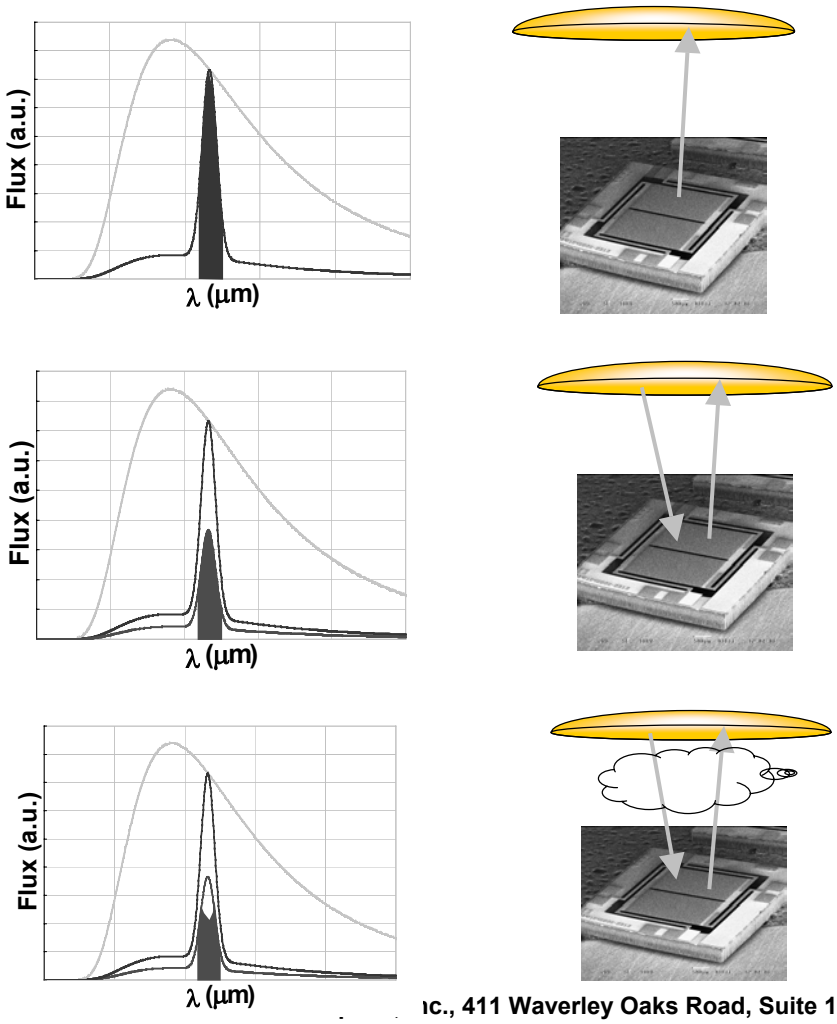
Ion Optics, Inc. (IOI) has designed, developed, and patented an optical technology for controlling (tuning) the infrared emission and absorption wavelengths of a semiconductor surface. A two-dimensional, photonic crystal produces the tuned-band spectrum. This structure is produced on the surface of a semiconductor wafer using standard, high-volume, semiconductor manufacturing techniques. Ion Optics is applying this proprietary technology to create small, accurate, reliable, low-power, and low-cost infrared sensors to detect gasses that affect indoor air quality or that are toxic or combustible. These sensors will be found in homes, automobiles, public buildings, and the work environment.

SensorChip™ BENEFITS

- Low power consumption
- No sensor poisoning by any gasses
- No cross interference
- Not affected by humidity
- Non-incendiary (Intrinsically Safe)
- Shock resistant



SEM photo of two different photonic crystal structures and their measured infrared emissions



HOW SensorChip™ WORKS

SensorChip™ contains a micro-bridge with a surface tuned to emit/absorb in the desired region. Electrical heating causes it to emit energy that matches the absorption characteristics of the target gas. The emitted infrared energy passes through the sample gas, reflects off a mirror at the far-end of the sample chamber, passes back through the gas, and is re-absorbed by the micro-bridge that also serves as a tuned infrared detector.

In this arrangement the micro-bridge receives energy from both the electrical stimulation and the reflected light and comes to thermal equilibrium. When the target gas is introduced, the amount of light re-absorbed by the silicon micro-bridge is reduced, causing the system to reside at a lower temperature. The drop in temperature is proportional to the concentration of the target gas, and is measured via a change in resistance or voltage across the micro-bridge.

Ion Optics, Inc.
Optical Gas Sensors for a Better Tomorrow

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