**Small Single Chip, Inexpensive, Mid Infra-red (IR) Sensor**

Technology #16589

**Applications**

Material analysis and identification for:

- spectroscopy
- chemical and bio-molecular sensing
- materials processing
- homeland security
- food and petrochemical industry

**Problem Addressed**

Fast and accurate detection of many chemical and biological substances has many applications and is a large and growing market. Mid IR sensors have shown promise in this field. However, detection of each specific material requires specific light source and detector. Therefore, fabrication of a single chip with multi-material detection capability becomes challenging as the light sources and detectors are bulky and expensive.

**Technology**

This technology enables fabrication of a mid-IR sensing chip with a single light source and a single detector that can sense a variety of materials. In this architecture, light path from the source to the detector is guided through different channels, each individually capable of detecting a specific material. Optical switches made of germanium antimony telluride (GST) control the light path. The optical switches are activated by electrical signals that change optical property of the GST. The whole arrangement can be implemented on a single monolithic device, enabling the construction of a single chip, multi-material detection system.

**Advantages**

- Small footprint
- Energy-efficient
- Inexpensive
- Scalable
- Integration with associated electronics
- Suitable for remote sensing

**Categories For This Invention:**

- Photonics
- Sensors (Photonics)
- Biosensors
Detectors
Imagers
Spectroscopy (Sensors)
Life Sciences
Instrumentation
Spectroscopy (Instrumentation)

**Intellectual Property:**
Methods and apparatus for infrared and mid-infrared sensing
PCT
2016-123088
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