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# High Sensitivity Mid-wave Infrared Thermal Sensor

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### Mid-Wave Infrared Thermal Sensor Detects Carbon Monoxide

There are no highly sensitive, uncooled mid infrared (IR) thermal sensors on the market. This wavelength is useful for detecting carbon monoxide and generic hyrdrocarbons and has applications in carbon monoxide detection, gas detection, and hydrocarbon detection. In the current generation of broadband detectors, the mid infrared region or MWIR (3-5 microns) is susceptible to interference from thermal sources in the far infrared region (FIR) which decreases detectivity.

### Modified Microbolometer Eliminates Noise from Thermal Sources

A standard microbolometer can be modified to selectively eliminated interference from thermal sources and increase detectivity. This is done by using materials in the microbolometer that have been designed to absorb wavelengths in the MWIR, but not the FIR range (the strongest thermal emission band). Ultrahigh sensitivity can be achieved by using a support structure with extremely high thermal isolation that ensures the thermal conductance noise is below the standard radiation level.

### Higher Detectivity

The high sensitivity, mid infrared thermal detector is better than the existing technology because it does not need to be cooled, and the higher detectivity can result in a handheld carbon monoxide detector, gas detector, or hydrocarbon sensor for first responders.

FEATURES AND BENEFITS OF MID-WAVE INFRARED THERMAL SENSOR:

- Uncooled thermal detector arrays with higher detectivity for carbon monoxide and generic hydrocarbon detectors
- Requires few changes to the existing microbolometer architectures and does not require an optical cavity (however, this can provide superior efficiency)
- Could achieve high sensitivity narrowband performance in MWIR similar to other technologies by placing a narrowband filter in front

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**Category**
Engineering & Physical Sciences/Instrumentation, Sensors & Controls

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