NDIR gas sensors, Mid-IR lasers, LEDs and detectors

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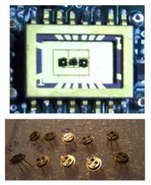
BAH in collaboration with Stonybrook University and Power Photonic Corporation ("PPC") has extensive experience in design and development of narrow-band semiconductor structures, such as LED's, detectors, laser. We are currently working on devices for the detection of numerous gases for safety, environmental, medical and homeland security applications.

Mid-IR LED's and detectors

MBE wafer growth

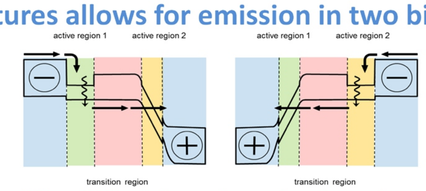
Packaging



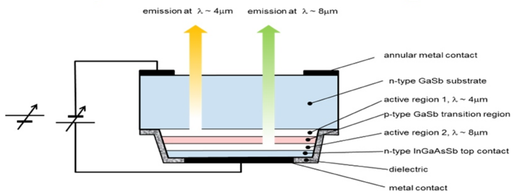
Packaged LED-receiver pairs:
- Matched 3.2 μm pair
- Integrated reference receiver
- Ceramic SOIC or TO package

New development: dual color LED for gas sensing

The structures allows for emission in two bias directions

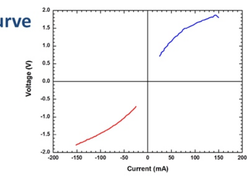


Simplified two-terminal design

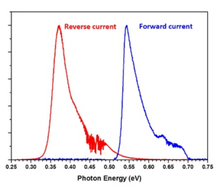


Demonstration: two wavelength emission

I-V curve

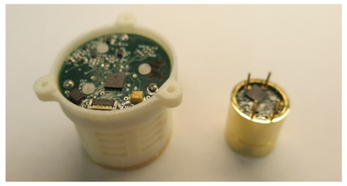


Emission spectrum



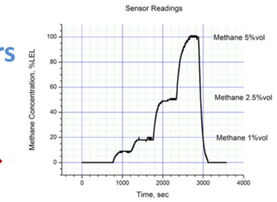
Low-power gas sensors

Low-power gas sensors
- 100 ppm methane sensitivity
- 100 μW average power consumption



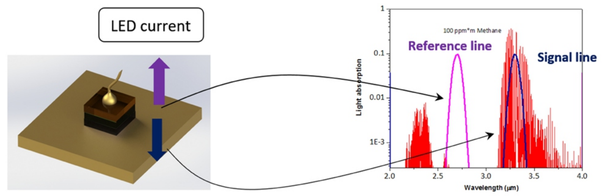
Applications:
- Household natural gas meters
- Building air quality
- Industrial processing

Response to methane →

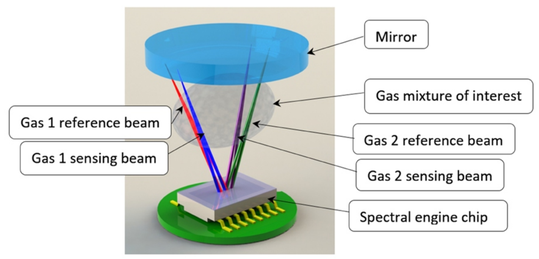


New development: gas sensor with spectral reference

Spectral reference greatly improves the sensor stability



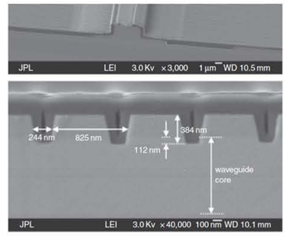
Compact design with a single spectral engine chip



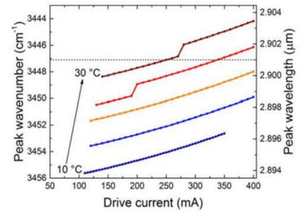
World-most powerful mid-IR lasers

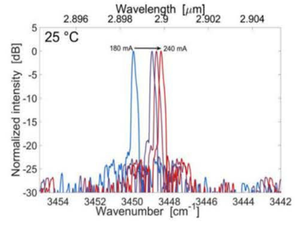
Both multi-mode and single mode lasers in 2.0 - 3.5 μm range

Single-mode laser structure

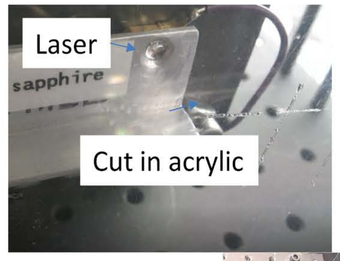


Single-mode laser can be easily tuned to the absorption line





New development: real time laser-assisted imaging



High power 3.2 μm imager
Applications:
- Long-range real time imaging
- of gas leaks
- Forensic imaging
- Material identification

Laser beam profile