



# Efficient graphene acoustic plasmon resonator

## A graphene-based device for ultrasensitive infrared spectroscopy and sensing

**IP Status:** US Patent Issued / Patent No.: US 11,885,985 B2

### Applications

- Photonics
- Molecular sensing

### Technology Overview

Professor Sang-Hyun Oh's research group at the University of Minnesota has developed a strategy to achieve graphene-based optical and plasmonic resonators with dramatically improved absorption and conversion efficiency (measured absorption of 94%) by utilizing a two-stage coupling scheme and by monolithically integrating an optical spacer and a back reflector. The large absorption enabled by this resonator, in turn, allows ultrasensitive detection of mid-infrared absorption bands from submonolayer protein films, other biomolecules, thin films, using far-field Fourier-transform infrared measurements.

The high efficiency of this resonator is achieved by utilizing a two-stage coupling scheme: free-space light coupled to conventional graphene plasmons, which then couple to ultra-confined acoustic plasmons. This intellectual property includes method of fabrication of the resonator as well as designs for monolithically integrated optical spacers and reflectors that further boost the enhancement.

### Phase of Development

**TRL: 3-4**

Prototype developed and tested in a lab environment.

### Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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### Researchers

- [Sang-Hyun Oh, PhD](#), Professor, Department of Electrical and Computer Engineering

### References

### Technology ID

2019-223

### Category

Engineering & Physical Sciences/Instrumentation, Sensors & Controls  
Engineering & Physical Sciences/Photonics

### Learn more



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