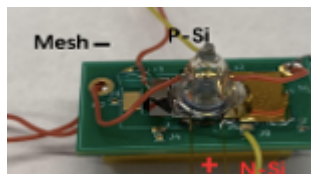# Avalanche Gas Ionization Detector

Technology number: 2023-368

OVERVIEW

Avalanche Photoionization Detector (APID) for enhanced sensitivity in vapor phase analyte detection

- Amplifies detection signal via internal avalanche process, boosting sensitivity
- Environmental monitoring, industrial safety, chemical analysis, and medical diagnostics

BACKGROUND

Photoionization detectors (PIDs) have long been employed to detect volatile organic compounds and other gaseous analytes by employing vacuum ultra-violet (VUV) light to ionize them. The resulting ions and electrons generate a current that serves as the detection signal. These detectors, while useful, often suffer from limited sensitivity due to the inherent limitations in ion generation and collection. Technological improvements have sought to enhance sensitivity and reduce detection limits, but many existing solutions still fall short in demanding applications such as trace gas analysis and rapid detection scenarios. An improved method is needed to amplify detection signals, thereby providing more accurate and lower detection limits in various analytical applications.

INNOVATION

Researchers have created an Avalanche Photoionization Detector (APID) that significantly advances the traditional PID technology by utilizing a VUV ionization source and a semiconductor electrode system. The electrons produced by the ionization process are collected and accelerated within a reversely biased semiconductor P/N junction, creating an avalanche electron multiplication effect. This internal avalanche process amplifies the detection signal, markedly increasing the sensitivity compared to conventional PIDs. The APID's enhanced sensitivity makes it ideal for applications requiring precise and rapid detection of vapor phase analytes, including environmental monitoring, industrial safety assessments, chemical analysis, and medical diagnostics.

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Category
Energy, Infrastructure and Environment
Hardware
Medical Devices
Life Sciences

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