

High Pressure Flow Cell for Spectral Analysis



CASE ID: UA 438-18

BACKGROUND

Optical flow cells enable spectroscopy equipment to easily and quickly detect and analyze chemical compositions and concentrations of fluids (gases or liquids). Gas analyses via some spectroscopy methods have traditionally presented diagnostic challenges due to weak signals and apparatus complexity. Notably, Raman spectroscopy is routinely used to analyze solids and liquids, but gases have been problematic due to the fact that Raman signals for solids and liquids are inherently weak and much more so for diffuse or episodic gas samples measured over small time intervals.

DESCRIPTION

To address this problem, UAF researchers have designed and built a prototype high-pressure flow cell that allows for high-speed but sensitive measurements at lower costs. The flow cell includes a heavy-walled, internally reflective glass capillary for concentrating and amplifying spectra, such as Raman spectra. The flow cell is innately rigid, durable, and optically straight offering improved operational reliability and reduced costs. Embodiments of the flow cell can enable detection of gas concentrations that can be very difficult to reliably measure with gas chromatography, especially if the presence of the gas is short-lived and/or episodic.

ADVANTAGES

- High-speed, low-cost, & sensitive measurements
- Scalable to different applications or installations

APPLICATIONS

- Gas sample analysis
- IR/UV/Raman spectroscopy

INTELLECTUAL PROPERTY

- US Patent Application No. 16/800,809
- Filed February 25, 2020

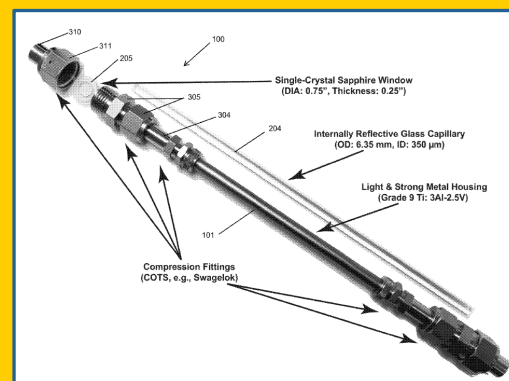


Figure 1. Flow Cell Prototype

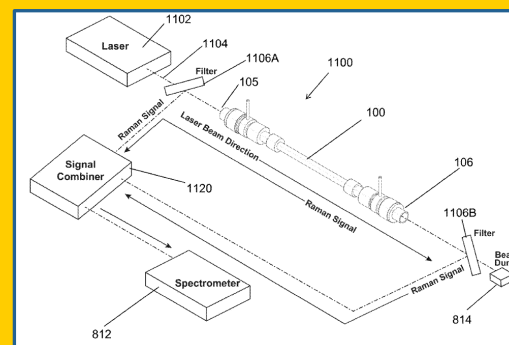


Figure 2. Spectral Analysis System

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