5380 PFPD

PULSED FLAME PHOTOMETRIC GC DETECTOR

OI Analytical's patented* 5380 Pulsed Flame Photometric Detector (PFPD) excels at selective, high sensitivity detection of sulfur, phosphorus, and other elements. The 5380 PFPD provides a 10–100x increase in signal-to-noise and a 10x increase in selectivity over traditional Flame Photometric Detectors and requires significantly less maintenance and gas to operate.

The 5380 PFPD consists of a 5380 Detector assembly, 5380 Detector Controller, pneumatic components located either in the Detector Controller or in the gas chromatograph (GC), and WinPulse user interface software.

Operating Principle

The PFPD operates using a propagating flame that terminates within a quartz combustor. Gas phase reactions produced by the propagating flame result in light emissions with specific luminescent spectra and lifetimes. The differences in specific emission lifetimes combined with the kinetics of the propagating flame allow both time and wavelength information to be used to improve the PFPD's selectivity and to decrease the observed noise, enhancing sensitivity. The propagating flame uses low combustible gas flow rates, increasing the relative analyte concentration. In addition, use of gated electronics permits acquisition of two simultaneous, mutually selective chromatograms.

PFPD Capabilities

- Superior sensitivity and increased selectivity for S and P compared to conventional FPDs
- Linear, equimolar response for quick, easy calibrations
- Simultaneous mutually selective chromatograms e.g.: S+C, or S+P
- Inherent self-cleaning design completely eliminates soot formation, or "coking", seen in other sulfur-selective detectors
- Long-term stability and minimal maintenance

Principal Applications

- Sulfur in petrochemicals
- Organophosphorus pesticides
- Flavor and fragrance analyses
- Sulfur in beverage-grade CO_2
- Simultaneous PFPD and MS detection
- Chemical warfare agents
- Organotin compounds in environmental samples
- Organometallic detection
- Explosives analysis
- P, S, As, and Si detection in the semiconductor industry
- Sulfur in pharmaceuticals

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5380 PFPD SPECIFICATIONS

Performance Specifications

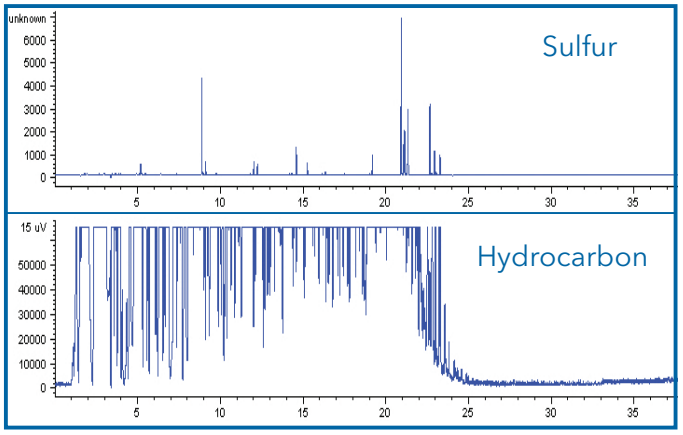
Detectivity	
Sulfur	<1 pg S/sec
Phosphorus	<100 fg P/sec
Sensitivity	
Sulfur Signal-to-Noise	>300 (at 10 pg S/sec elution rate peak-to-peak noise)
Drift (S or P)	<10x peak-to-peak noise in 20 min
Selectivity (at Optimum Detectivity Levels)	
Sulfur	> 10^6 S/C
Phosphorus	> 10^5 P/C (selectivity is adjustable with a trade-off in detectivity)
Detector Linearity	
Sulfur	Quadratic in response. Linear to approximately three orders of magnitude.
Phosphorus	First order linear over approximately three orders of magnitude.
Response Uniformity	Equimolar ± 8% (S, P)
Chromatographic Peak Tailing	<0.2 sec in S and P
Gas Requirements	
Carrier	He or H_2 at 80 psig; 99.8% purity or better
Air	60 psig; zero air (CGA grade E)
Hydrogen	60 psig; 99.995% purity or better (electrolytic grade)
Power Requirements	115/230 V_{AC}
Computer Requirements	
Operating System	Windows® XP Pro, Windows® 7
Comm Ports	One serial (RS-232), 16550 UART or USB to Serial Adaptor
Minimum Temperature	180 °C
Maximum Temperature	420 °C
Carrier Gas	5 mL/min maximum flow rate Helium; up to 10mL/min using H_2 carrier gas
Typical Gas Consumption	
H_2	10-15 mL/min
Air	20-30 mL/min
Humidity	5-80% relative humidity
Altitude	2,000 m maximum

Controller Board Inputs and Outputs	
Two Channels	0–1 V
One Serial	RS-232-C
One Signal In	Electrometer; PFPD
High Voltage Out	PMT 0–1,000 V
Ignitor Current	0–3.4 A
Oscilloscope Output	20 Hz, 25 ms display
S/W HV Protection	PMT Protection
Timed Events (from GC Remote Start)	Autozero, range, attenuation, ignitor, mode or channel (e.g. S, P, C), and record
Controller Dimensions	22.2 cm H x 14 cm W x 33 cm D (8.75" H x 5.5" W x 13"D)
Pneumatic Control (Standard)	Manual control of detector gases with mass flow controllers and metering valve

Options

PFPDView Software	For post-acquisition signal processing
Pneumatic Control	Automatic using GC electronic flow control of detector gases
Combustor	3 mm

Simultaneous sulfur and hydrocarbon chromatograms of gasoline containing 5 ppm total sulfur.



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