

# Measuring H<sub>2</sub>S + Mercaptans in LPG

Applied Analytics Application Note No. AN-037



## Application Summary

Analytes: **H<sub>2</sub>S (hydrogen sulfide), mercaptans**

Detector: **OMA-300 Process Analyzer**

Process Stream: **liquefied petroleum gases (propane, propylene, butane)**

## Introduction

H<sub>2</sub>S is highly undesirable in liquefied petroleum gas (LPG) for several reasons:

- » **Storage.** When storing produced LPGs for later distribution, H<sub>2</sub>S causes corrosion in the expensive sphere tanks.
- » **Polymer yield.** Sulfur compounds reduce the polymer yield in polyolefins like polypropylene.
- » **Catalysts.** H<sub>2</sub>S is known to poison catalysts in reactions that use LPGs as feedstock.
- » **Emissions.** When burning propane or any other LPG, H<sub>2</sub>S will oxidize to SO<sub>2</sub>, a particularly harmful emission.

Controlling H<sub>2</sub>S and mercaptans in LPG requires online concentration measurement. Whether measuring the LPG entering the storage tank or analyzing the propylene feed to plastics production, the ability to respond quickly to changes in sulfur loading is critical for tight process control.

The OMA H<sub>2</sub>S Analyzer uses a dispersive UV-Vis spectrophotometer to measure H<sub>2</sub>S and mercaptans simultaneously in hydrocarbon streams with fast response and solid state reliability.

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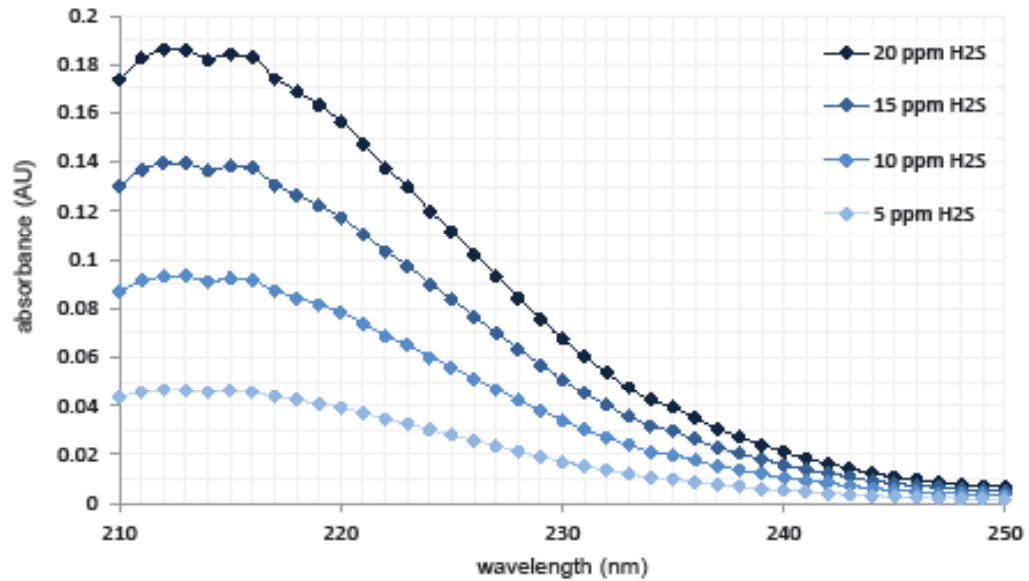
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## Analyte Absorbance Curves

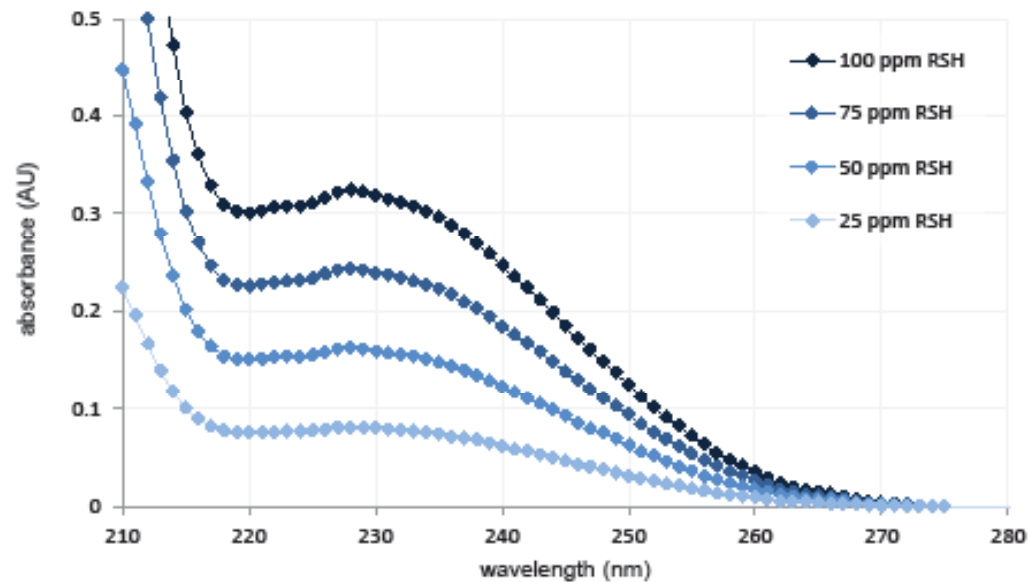
Any single photodiode measurement is vulnerable to noise, signal saturation, or unexpected interference. This susceptibility to error makes a lone photodiode data point an unreliable indicator of one chemical's absorbance.

As accepted in the lab community for decades, the best way to neutralize this type of error is to use collateral data in the form of 'confirmation wavelengths,' i.e. many data points at many wavelengths instead of a single wavelength:

H<sub>2</sub>S



RSH



In the figures above, each diamond represents a single photodiode and data point. The OMA measures absorbance at each integer wavelength within the measurement wavelength range and produces analyte absorbance curves. This use of 'confirmation wavelengths' instead of simple peak absorbance measurement serves to eradicate the effect of noise at any single photodiode, allowing for a much more accurate analysis and the ability to deconvolute components using AAI's multi components algorithm\*.

\*Provide sample matrix to AAI for verification.

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## Example Installation

The system below measures mercaptans in propane (0-50 ppm) in Peru:



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The specifications below represent performance of the OMA-300 Process Analyzer in a typical LPG application.

For technical details about the OMA-300 Process Analyzer, see the data sheet:

[http://aai.solutions/documents/AA\\_DS001A\\_OMA300.pdf](http://aai.solutions/documents/AA_DS001A_OMA300.pdf)

All performance specifications are subject to the assumption that the sample conditioning system and unit installation are approved by Applied Analytics. For any other arrangement, please inquire directly with Sales.

Subject to modifications. Specified product characteristics and technical data do not serve as guarantee declarations.

Application Data		
Performance Specifications		
	<i>Accuracies below hold true unless otherwise noted in technical proposal.</i>	
Accuracy	<b>H<sub>2</sub>S</b>	±2% full scale
	<b>mercaptans (RSH)</b>	±2% full scale

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## Further Reading

OMA-300 Process Analyzer Data sheet	<a href="http://aai.solutions/documents/AA_DS001A_OMA300.pdf">http://aai.solutions/documents/AA_DS001A_OMA300.pdf</a>
Advantage of Collateral Data Technical Note	<a href="http://aai.solutions/documents/AA_TN-202_CollateralData.pdf">http://aai.solutions/documents/AA_TN-202_CollateralData.pdf</a>



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