

## Application Note

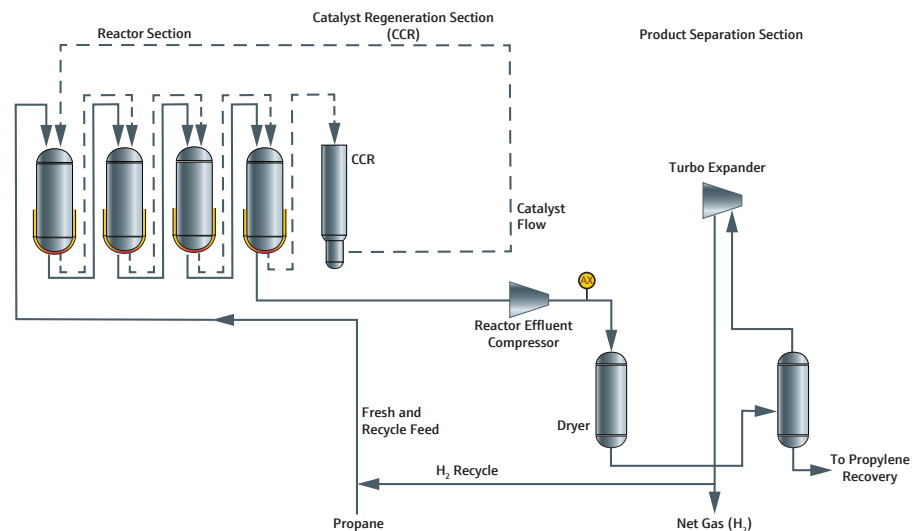
# H<sub>2</sub>S in UOP C<sub>3</sub> Oleflex process reactor effluent

Industry:  
Petrochemicals  
Application Note 55202

### Key Points

- Exceptionally fast response to H<sub>2</sub>S concentration changes
- Laser-based measurement is highly selective and accurate for H<sub>2</sub>S measurement in C<sub>3</sub> Oleflex process reactor effluent gas
- Low maintenance and OPEX costs – no proprietary, consumable lead acetate tape and acetic acid reagent
- Laser-based analyzer does not require mechanical components (tape drive system for paper reels / cartridges) for operation and measurements

The UOP C<sub>3</sub> Oleflex propane dehydrogenation (PDH) process produces polymer-grade propylene from propane feedstock. Propane flows through four reactors containing platinum-based catalyst which dehydrogenates propane into propylene. The catalyst is slowly circulated to a continuous catalyst regeneration (CCR) vessel where coke deposits on the catalyst are removed by high-temperature oxidation to restore catalyst activity. Reactor effluent is sent to a product separation section to fractionate and recover propylene and send recycle gas to the reactors.



The UOP C<sub>3</sub> Oleflex Propane Dehydrogenation (PDH) Process

**On-line H<sub>2</sub>S measurement** of the effluent gas from the C<sub>3</sub> Oleflex reactors helps prevent recycle gas with excessive levels of H<sub>2</sub>S from entering the reactors and reducing catalyst activity and the yield of propylene.

**SpectraSensors' solution** SpectraSensors tunable diode laser absorption spectroscopy (TDLAS) analyzers have proven effective in this important measurement. TDLAS analyzers have an exceptionally fast response to changes in H<sub>2</sub>S concentration enabling improved process control. Laser spectroscopy measurement of H<sub>2</sub>S requires no proprietary, consumable items or reagents such as lead acetate paper tape, so TDLAS analyzers are more reliable and have higher analyzer availability than lead acetate tape analyzers.

## Application Data

|                            |   |
|----------------------------|---|
| Target Component (Analyte) | H <sub>2</sub> S in UOP C <sub>3</sub> Oleflex PDH Process<br>Reactor Effluent Compressor Discharge |
| Typical Measurement Range  | 0-150 ppm <sub>v</sub>  |
| Typical Repeatability      | ± 1 ppm <sub>v</sub> or 2% of reading (whichever is greater)  |
| Measurement Response Time  | 1 to ~60 seconds  |
| Principle of Measurement   | Tunable Diode Laser Absorption Spectroscopy   |
| Validation                 | Certified blend of H <sub>2</sub> S in Nitrogen   |

## Typical Background Stream Composition

| Component                                  | Minimum (Mol%) | Typical (Mol%) | Maximum (Mol%) |
|--|----------------|----------------|----------------|
| Hydrogen (H <sub>2</sub> )                 | 32             | 42             | 46             |
| Methane (CH <sub>4</sub> )                 | 0.2            | 3              | 4              |
| Ethane (C <sub>2</sub> H <sub>6</sub> )    | 0.2            | 1.5            | 3              |
| Ethylene (C <sub>2</sub> H <sub>4</sub> )  | 0              | 0.1            | 0.2            |
| Propane (C <sub>3</sub> H <sub>8</sub> )   | 32             | 36             | 58             |
| Propylene (C <sub>3</sub> H <sub>6</sub> ) | 0.9            | 15.5           | 18             |
| C <sub>4</sub> +                           | 0              | 0.1            | 0.3            |