Measuring H2S in a Hydromet Reactor Headspace

Applied Analytics Application Note No. AN-052

Application Summary

Analytes: **Hydrogen sulfide (H_2S)**

Detector: **OMA-300 Process Analyzer**

Process Stream: **Hydrometallurgy Reactor Headspace**

Typical Measurement Range: **0-100 %**

Introduction

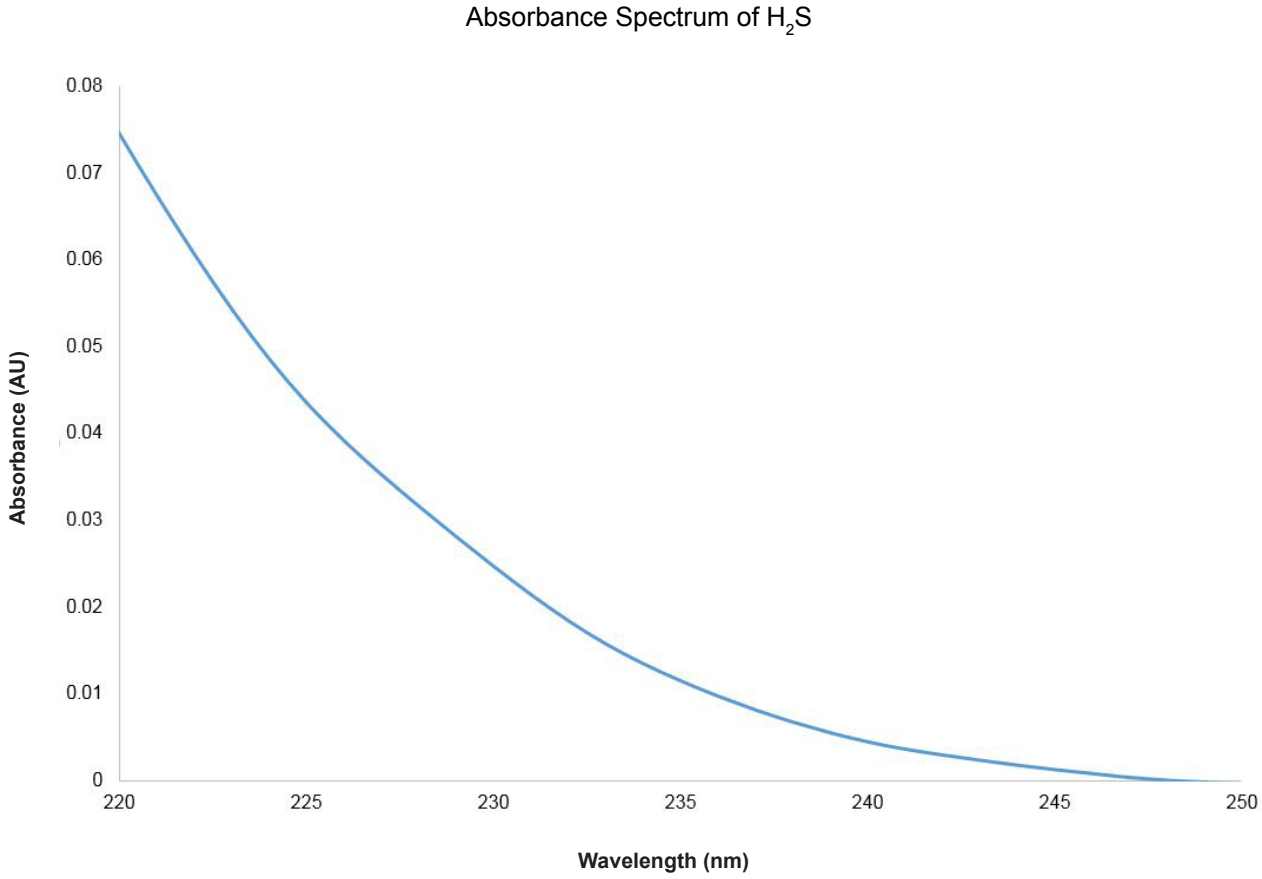
Hydrometallurgy (or “hydromet” for short) involves dissolving metal from ore by combining oxygen, water, and other substances inside a pressurized vessel. Hydrometallurgy is generally used with oxide ores and sulfide mine wastes. The process of hydrometallurgy consists of different steps, with the first step being leaching. The process of leaching involves the use of an aqueous solution, comprised of a weak acid, to extract metal from ore. Sulfuric acid is typically used as it is commonly generated and recycled in hydrometallurgy plants.

The process of leaching can be done in many ways. Two common leaching methods are tank and autoclave leaching. Both of these methods utilize a hydromet reactor in order to contact the ore with an acidic leach solution.

There are various ways to separate the metal from the aqueous leachate solution. When the ore is contacted with sulfuric acid during the leaching process, a metal sulfate will form. One way of separating the metal is to precipitate the aqueous solution of metal sulfate into a metal sulfide. This can be achieved by running H_2S through the aqueous solution. The concentration of the H_2S feed used for this process could be anywhere from 10 to 100 % by volume. The metal sulfide precipitant that is produced is then processed further to isolate the metal. The H_2S feed in this process must be closely monitored to ensure that a high enough concentration of gas is being run through the metal sulfate solution. H_2S may also accumulate in the headspace of a hydromet reactor. The H_2S here must be monitored to ensure a safe operation. H_2S has a lower explosive limit of 4%.

System Benefits: OMA-300 Process Analyzer

- Continuously measures H_2S levels using UV-Vis spectrophotometer
- Totally solid-state build with no moving parts — modern design for low maintenance
- Additional software benches for up to 4 chemical analytes
- Ultra-safe fiber optic design with no sample gas inside analyzer unit — world’s safest solution for this application



This spectrum was taken with the OMA-300 Process Analyzer on a calibration standard mixture of 1% H_2S.

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