Sulfide - Methylene Blue Method

Version 9 / Jun 2023

Applications and Industries

Groundwater, wastewater, industrial process waters

References

APHA Standard Methods, 23rd ed., Method 4500-S_2^- D - 2000
EPA Methods for Chemical Analysis of Water and Wastes, Method 376.2 (1983)

Chemistry

In an acidic solution, sulfide reacts with N,N-dimethyl-p-phenylenediamine and ferric chloride to produce methylene blue. The resulting blue color is directly proportional to the sulfide concentration. Results are expressed in ppm (mg/L) sulfide as S.

Available Analysis Systems

Visual colorimetric: CHEMets®, VACUettes®
Instrumental colorimetric: Vacu-vials®

Storage Requirements

Products should be stored in the dark and at room temperature.

Shelf Life

When stored in the dark and at room temperature:
Visual colorimetric:
CHEMets and VACUettes refills, color comparators, Activator Solution: at least 1 year
Instrumental colorimetric:
Vacu-vials kit: at least 1 year

Safety Information

Safety Data Sheets (SDS) are available upon request and at www.chemetrics.com. Read SDS before using these products. Breaking the tip of an ampoule in air rather than water may cause the glass ampoule to shatter. Wear safety glasses and protective gloves.

Analyte-Specific Information

Sulfide is not stable in aqueous solutions, particularly at pHs below 7. Samples should be analyzed immediately after collection and agitation of the sample should be minimized.

Interference Information

- The methylene blue chemistry measures acid soluble sulfides, which include unionized hydrogen sulfide (H_2S), HS^-, and acid-soluble metallic sulfides. The chemistry does not detect insoluble sulfides (e.g. copper and silver sulfides), sulfides tightly bound within a chemical compound, or organic sulfides (e.g. mercaptans).
  Note: If present in a water sample, mercaptans can impart an odor similar to that of hydrogen sulfide.
- Strong reducing agents, including thiosulfate and sulfite, interfere with this chemistry by preventing or diminishing color development.
- Iodide (often present in oil field wastewaters) at concentrations greater than 2 ppm may diminish color formation.
- Ferrocyanide produces a blue color with the reagent.
- Sulfide itself prevents the reaction if its concentration is high (approximately 10X the test range).
- Chlorine, hydrogen peroxide, and other strong oxidizing agents may interfere by forming a pink color with the reagent.
- Low test results will be obtained with samples having pHs above 10.5 or with samples buffered to a high pH. Adjustment of the sample pH to near neutral will eliminate this interference.
- Sample color or turbidity may make a color match difficult during visual colorimetric testing and may cause a false positive result with instrumental colorimetric tests. CHEMetrics' Sample Zeroing Accessory Pack can be used to correct for potential errors during instrumental analysis.

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Accuracy Statement

Statements of accuracy are based on laboratory tests performed under ideal testing conditions using standards of known concentration prepared in deionized water.

CHEMets and VACUettes kits: ± 1 color standard increment

Vacu-vials kits:

K-9503 with Spectrophotometer:

≤ 0.05 ppm at 0 ppm
± 0.03 ppm at 0.10 ppm
± 0.06 ppm at 0.20 ppm
± 0.23 ppm at 0.75 ppm

K-9503 with V-2000, V-3000:

≤ 0.10 ppm at 0 ppm
± 0.08 ppm with V-2000, ± 0.06 with V-3000 at 0.20 ppm
± 0.23 ppm at 0.75 ppm
± 0.68 ppm at 2.25 ppm

K-9523:

≤ 0.30 ppm at 0 ppm
± 0.18 ppm at 0.60 ppm
± 0.45 ppm at 1.50 ppm
± 1.35 ppm at 4.50 ppm

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