

DETERMINATION OF BROMIDE IN WATER

A method for the measurement of bromide ion in ground, drinking and waste waters containing from 0.5 ppm to 1000 ppm bromide.

This range may be extended by dilution of an appropriate aliquot.

Equipment Required

1. EDT directION Model DR359TX Ion meter or pH meter with millivolt scale
2. EDT directION Bromide ion selective electrode (3271)

Reagents

1. Ionic strength adjustment buffer (ISAB) 5M NaNO₃
2. Bromide standard solution, 10,000 ppm
3. Nickel sulphate solution, 1M

Standard Preparation

ISAB - Dissolve 42.5g A.R. grade NaNO₃ in distilled water and dilute to 100 mls.

Bromide Standard Solution

Dissolve 12.88g of A.R. grade NaBr in distilled water and dilute to 1 litre.

Make up standards of 1000, 100, 10 and 1 ppm by serial dilution of the 10,000 ppm standard.

Nickel Sulphate Solution, 1M

Dissolve 26.3g of NiSO₄.6H₂O in distilled water. Dilute to 100 ml.

Sample Preparation

To any sample containing sulphide or cyanide, add 0.1 ml nickel sulphate solution per 100 mls of sample. This will react with 58 ppm sulphide or 117 ppm cyanide.

To each 100 ml of sample add 2 ml of ISAB and stir thoroughly.

Method

To 100 ml of each standard add 2 ml of ISAB. If any samples require treatment for interferences, prepare standards with same background.

Immerse the electrode in each of the standards in increasing concentration steps, rinsing the electrodes with distilled water between standards and record the mV response of the electrode.

Plot a graph on lin/log graph paper of mV response against standard concentration.

Immerse the electrodes in the sample solution, record the mV response of the electrodes and plot sample concentration from the graph.

This determination may be carried out directly in concentration units by use of the "concentration" mode on EDT directION pH/ion analysers.

Calculations

As both the standards and the sample have been diluted by the same amount the result obtained from the graph is the concentration of the original sample.

Interferences:

Sulphide and cyanide ion interference is removed by the addition of the $\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$ solution.

Concentrations of free metal ions causing a 10% error are:

Bismuth	Bi^{+++}	80 ppm
Cadmium	Cd^{++}	100 ppm
Lead	Pb^{++}	1600 ppm
Tin	Sn^{++}	2400 ppm
Thallium	Tl^{+++}	4 ppm

Chloride and hydroxide do not interfere when present in concentrations in excess of bromide by up to 4×10^2 and 3×10^4 respectively.

There will be no interference from ammonia when present in concentrations twice that of bromide, nor from thiosulphate 20 times as concentrated as bromide. Iodide is an interference at a concentration ratio of 2×10^{-4} . Mercury should be absent from the sample.