

Cobalt

Method: Dimetilglioxime in 0.1 M tartrate buffer, pH 9

Function: Differential Pulse Voltammetry (DPV/a)

Start Potential (mV)	-700
End Potential (mV)	-1300
Current range	2,048
Scan Speed (mV/s)	50
Number of cycles	3
Delay before sweep (s)	5
Purge and stir time (s)	300
Stirring speed (rpm)	300
Drop Size (a.u.)	60

Cobalt concentrated standard solution (1 g/l)

Dissolve 1 g of Cobalt in a minimum volume of 6 M HCl. Bring to volume in a 1 l volumetric flask with distilled water.

Supporting Electrolyte

1 – Tartrate buffer 1 M, pH 9

Dissolve 15 g of tartaric acid in 50 ml of distilled water. Add 26% NH₃ until pH 9. Bring to volume with distilled water, in a 100 ml volumetric flask

2 – 1% dimetilglioxime solution

Dissolve 100 mg of dimetilglioxime in 10 ml of ethanol. Prepare the solution at the moment of analysis.

3- 5 M NaNO₂ solution

Dissolve 34.5 g of NaNO₂ in 100 ml of distilled water.

Procedure

To 10 ml of sample solution add 1 ml of tartrate buffer solution, 100 µl of dimetilglioxime solution and 500 µl of NaNO₂ solution.

Working standard solution (1 mg/l)

Dilute 1+999 the concentrated standard solution with distilled water. Prepare the solution at the moment of the analysis.

Warnings

Alternative buffer solution, same pH: PIPES o HEPES.

If sample concentration is below 1 µg/l it is better to make a stripping voltammetry setting a deposition time of 30 – 120 s and a deposition potential of –700 mV.

If cobalt is present in trace in a matrix with high content of nickel or zinc it is necessary a more sensitive method: same buffer containing 10⁻⁴ M nioxime and NaNO₂.

Analytical Report

Analysis: Cobalt in deep water
 Sample Concentration = 3.85 µg/l
 Method: 5 additions

Volumes Table

Solvent Volume 0 (ml)
 Supporting Sol. 1.05 (ml)
 Sample Volume 10 (ml)
 Standard Conc. 1000 (µg/l)

Height Table

#	Peak Pot.	Height
0	-1056.5	437.8 nA
1	-1054.2	1.438 µA
2	-1052.6	2.412 µA
3	-1052.8	3.502 µA
4	-1052.6	4.444 µA
5	-1050.3	5.447 µA

Regression Data

#	Add. Conc.	Height x dilution
0	0 µg/l	483.8 nA
1	10.0 "	1.604 µA
2	20.0 "	2.714 µA
3	30.0 "	3.975 µA
4	40.0 "	5.089 µA
5	50.0 "	6.292 µA

