

Aluminium

Method: Calcone in 0.1 M acetate buffer, pH 4.7

Function: Differential Pulse Voltammetry (DPV/a)

Start Potential (mV)	-100
End Potential (mV)	-900
Current range	2,048 μ A
Scan Speed (mV/s)	20
Number of cycles	3
Delay before sweep (s)	5
Purge and stir time (s)	300
Stirring speed (rpm)	300
Drop Size (a.u.)	60

Aluminium concentrated standard solution (1 g/l)

Dissolve 17.54 g of $\text{KAl}(\text{SO}_4)_2 \cdot 12 \text{H}_2\text{O}$ in 1 l of 1% HCl in a volumetric flask.

($\text{MM}_{\text{KAl}(\text{SO}_4)_2 \cdot 12 \text{H}_2\text{O}} = 474.39$; $\text{MM}_{\text{Al}} = 26.98$).

Supporting electrolyte

1- Acetate buffer, pH 4.7

Dissolve 13.6 g of $\text{CH}_3\text{COONa} \cdot 3 \text{H}_2\text{O}$ in 800 ml of distilled water. Bring the solution to pH 4.7 ± 0.1 by adding CH_3COOH . Bring to the mark in a 1 l volumetric flask with distilled water.

2- 0.05% Calcone solution (blue – black erio crhome)

Dissolve 50 mg of calcone in 100 ml of ethanol - water (50+50, v/v).

Procedure

Pour 10 ml of sample in the cell, add 2 ml of buffer solution (alternatively add 136 mg of $\text{CH}_3\text{COONa} \cdot 3 \text{H}_2\text{O}$), add and 1 ml of calcone solution. Adjust pH to 4.7 by using CH_3COOH or NH_3 (avoid NaOH or KOH). Scan voltammograms until the peak height is reproducible and then start the analysis.

Working standard solution (1 mg/l)

Pour 10 ml of buffer solution in a 50 ml volumetric flask, add 5 ml of calcone solution and 50 μ l of Al concentrated standard solution. Bring to the mark with distilled water. Prepare the solution at least 15 minutes before the use.

Remarks

Samples have to be treated in way to obtain only Al^{3+} in solution. Other chemical forms of aluminium have to be treated to transform themselves in Al^{3+} form.

Do not use NaOH e KOH because they are polluted by aluminium.

Alternatively use Solochrome violet RS, using same conditions..

Analytical report

Analysis: tap water

Sample Concentration = 6.08 $\mu\text{g/l}$

Method: 3 additions

Volumes Table

Solvent Volume	0 (ml)
Supporting Sol.	2.1 (ml)
Sample Volume	8 (ml)
Standard Conc.	1000 ($\mu\text{g/l}$)

Heights Table

#	Peak Pot.	Height
0	-391.6	71.92 nA
1	-407.5	311.4 nA
2	-411.1	549.0 nA
3	-414.1	807.6 nA

Regression Data

#	Add. Conc.	Height x dilution
0	0 $\mu\text{g/l}$	90.80 nA
1	25.0 "	401.0 nA
2	50.0 "	720.6 nA
3	75.0 "	1.080 μA

$$y = ax + b$$

$$a = 13.15 \text{ nA} \cdot \text{l} / \mu\text{g}$$

$$b = 79.97 \text{ nA}$$

$$r^2 = .9987$$

