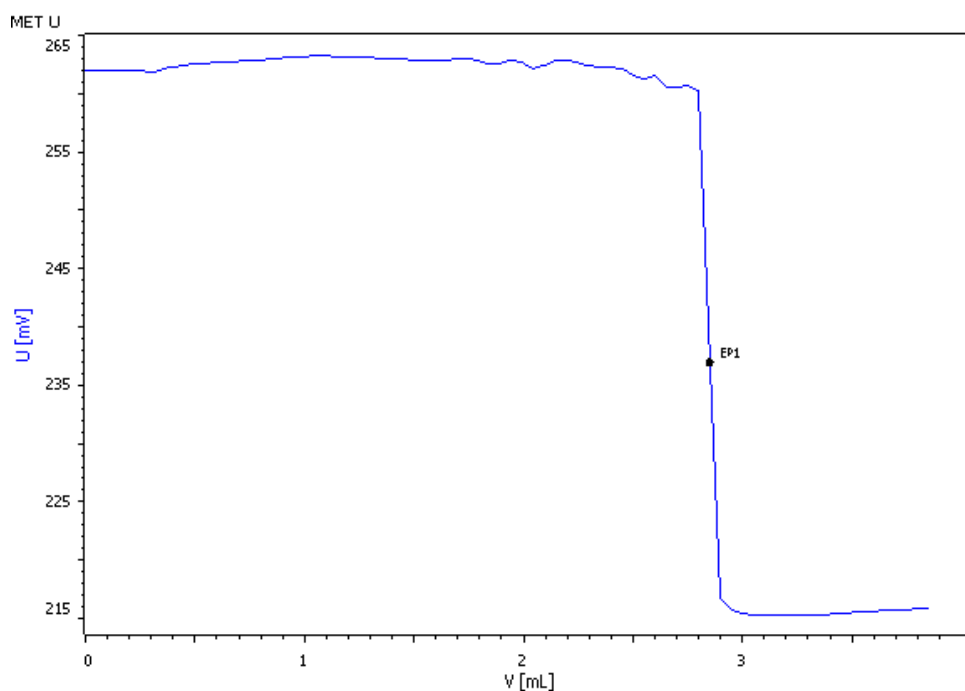# Mercury analysis by automated photometric titration

Mercury can be determined in alkaline media by back-titration with zinc sulfate using eriochrome black T as indicator and the Optrode at a wavelength of 502 nm for indication.

Ω **Metrohm**

Method description

Sample

Aqueous solution of mercury (0.05 mol/L)

Sample preparation

No sample preparation is required.

Configuration

907 Titrando	2.907.0020
815 Robotic USB Sample Processor XL	2.815.0020
786 Swing head	2.786.0040
Swing arm	6.1462.070
Titration head	6.1458.010
Sample rack 28 x 200 mL	6.2041.830
800 Dosino, 5x	2.800.0010
802 Stirrer	2.802.0020
5 mL Dosing unit	6.3032.150
10 mL Dosing unit, 2x	6.3032.210
20 mL Dosing unit	6.3032.220
50 mL Dosing unit	6.3032.250
Disposable PP sample beaker, 200 mL	6.1459.310
Optrode	6.1115.000

Solutions

Titrant	$c(ZnSO_4)$ = 0.1 mol/L
	28.9 g $ZnSO_4 \cdot 7\ H_2O$ is weighted into a 1000 mL volumetric flask and dissolved in approx. 500 mL deion. water. After the addition of 0.5 mL $w(H_2SO_4)$ = 25% the solution is filled up to the mark with deion. water.
EDTA solution	$c(Na_2EDTA)$ = 0.1 mol/L
	If possible this solution should be bought from a supplier.
Eriochrom black T	100 mg eriochrom black T and 100 mg ascorbic acid are dissolved in 100 mL deion. water.

Buffer solution pH 10	54 g NH_4Cl is weighed into a 1 L volumetric flask and dissolved in deion. water. 350 mL $w(NH_3)$ = 25% is added and the mixture made up to 1 L with deion. water.

Analysis

5 mL sample solution is pipetted into a 200 mL plastic beaker and 90 mL deion. water is added. After the addition of 5 mL ammonia buffer, 5 mL $c(Na_2EDTA)$ = 0.1 mol/L and 1 mL eriochrome black T indicator solution, the solution is titrated with $c(ZnSO_4)$ = 0.1 mol/L until after the equivalence point.

Parameters

Mode	MET U
Stirring rate	8
Pause	60 s
Signal drift	20 mV/min
Min. waiting time	0 s
Max. waiting time	38 s
Volume increment	0.05 mL
EP criterion	15 mV
EP recognition	greatest
Stop EP	1
Volume after EP	1 mL

Results

Mean results (n = 5)

Hg content / (g/L)	8.704
s(rel) / %	0.47

Comments

Only Hg(II) can be determined as Hg(I) disproportionates to Hg(II) and elemental mercury in presence of EDTA.

Ω Metrohm