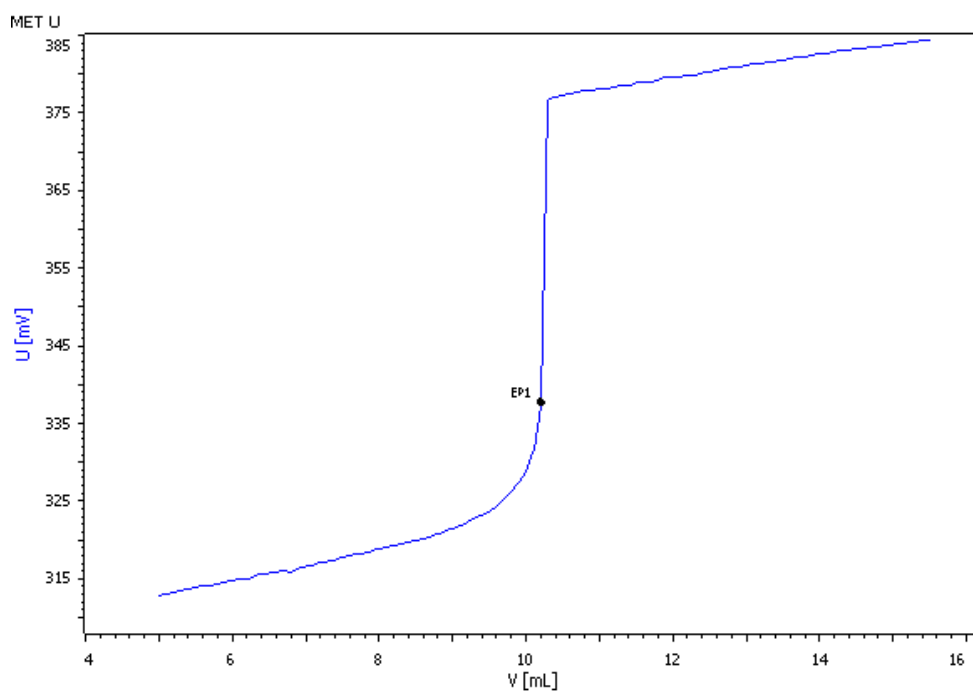# Cadmium analysis using automated photometric titration

Cadmium can be determined in aqueous solutions by back-titration with zinc sulfate. As indicator Eriochrome Black T and for indication the Optrode at a wavelength of 610 nm is used.

Ω Metrohm

Method description

Sample

Aqueous solution of cadmium (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, 4 x	2.800.0010
802 Stirrer	2.802.0020
5 mL Dosing unit	6.3032.150
10 mL Dosing unit, 2 x	6.3032.210
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.
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.
Eriochrome Black T	100 mg Eriochrome Black T and 100 mg ascorbic acid are dissolved in 100 mL deion. water.

Analysis

5-15 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, 10.0 mL $c(Na_2EDTA) = 0.1$ mol/L and 0.25 mL Eriochrome Black T indicator solution, the solution is titrated with $c(ZnSO_4) = 0.1$ mol/L until after the endpoint.

Parameters

Mode	MET U
Pause	30 s
Stirring rate	8
Signal drift	50 mV/min
Min. waiting time	5 s
Max. waiting time	26 s
Volume increment	0.1 mL
EP criterion	15 mV
EP recognition	Greatest
Stop volume	10 mL

Results

Mean results (n = 6)

Cd content / (g/L)	5.87
s(rel) / (%)	1.28

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