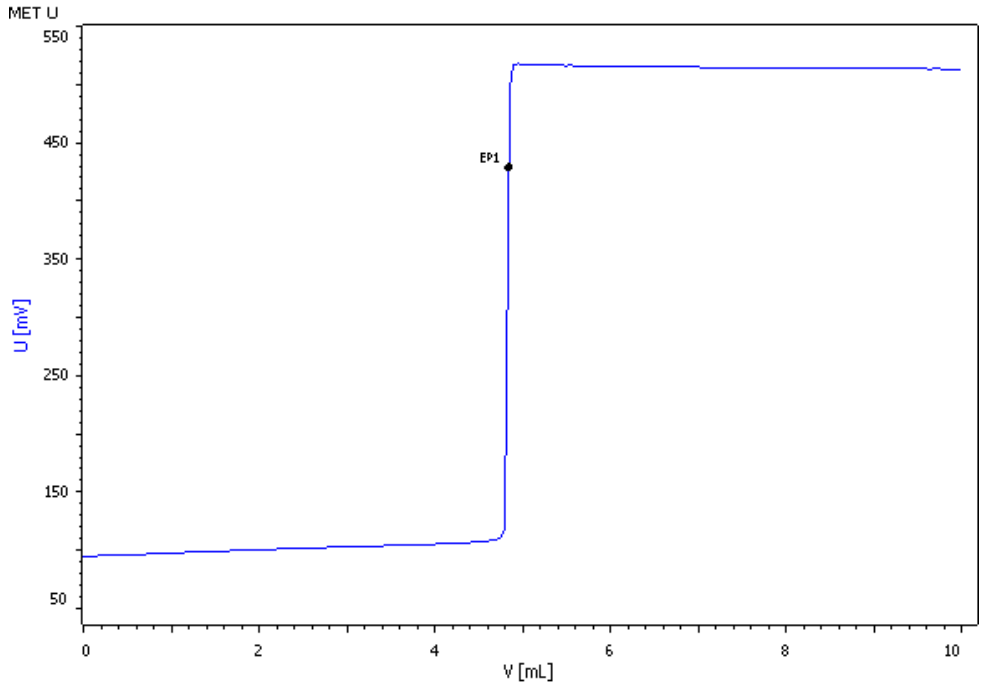
Titration Application Note T-147

Thallium analysis using automated photometric titration



Thallium can be titrated as Tl(III) in slightly acidic medium. To visualize the equivalence point, the indicator xylenol orange is used. The indication is done with the Optrode at a wavelength of 574 nm.

Metrohm

Method description

Sample

Aqueous solution of thallium (0.025 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, 3 x	2.800.0010
802 Stirrer	2.802.0020
5 mL Dosing unit	6.3032.150
10 mL Dosing unit	6.3032.210
50 mL Dosing unit	6.3032.250
Disposable PP sample beaker, 200 mL, 1000 pieces	6.1459.310
Optrode	6.1115.000

Solutions

EDTA solution	c(Na_2EDTA) = 0.1 mol/L If possible this solution should be bought from a supplier.
Xylenol orange disodium salt	50 mg Xylenol orange disodium salt is dissolved in 50 mL deion. water.
Acetate buffer pH = 4.9	123 g sodium acetate and 50 mL glacial acetic are given into a 1 L volumetric flask and the flask is filled up to the mark with deion. water.

Analysis

10–30 mL sample solution is pipetted into a 200 mL plastic beaker and 90 mL deion. water is added. After the addition of 5 mL acetate buffer and 0.5 mL xylenolorange disodium salt indicator solution the thallium is titrated with c(Na_2EDTA) = 0.1 mol/L until after the equivalence point.

Parameters

Mode	MET U
Pause	30 s
Stirring rate	8
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 volume	10 mL

Results

Mean results (n = 6)

Tl^{3+} content / (g/L)	4.937
s(rel) / %	0.37

www.metrohm.com

Metrohm