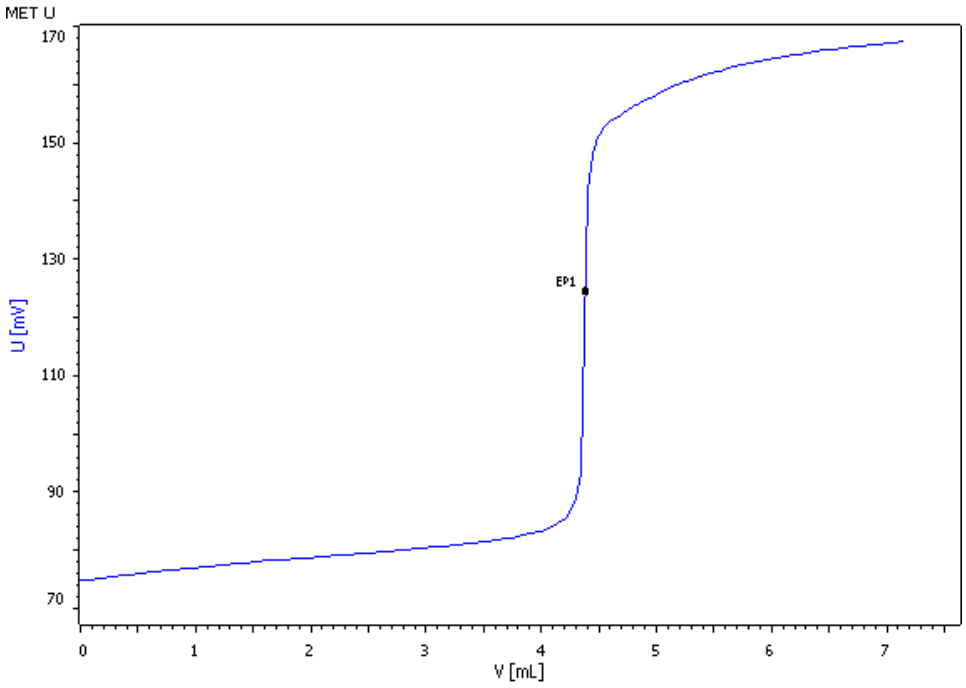
Titration Application Note T–149

Thorium analysis using automated photometric titration



Thorium is determined at pH 4.9 by titration with EDTA. To visualize the equivalence point, xylenol orange is used as indicator. The equivalence point is detected with the Optrode at a wavelength of 574 nm.

Metrohm

Method description

Sample

Aqueous solution of thorium (~0.1 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
Stirring propeller	6.1909.020
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

Solutions

EDTA solution	c(Na_2EDTA) = 0.1 mol/L If possible this solution should be bought from a supplier.
Xylenol Orange	100 mg xylenol orange is dissolved in 100 mL deion. water
Acetate buffer pH 4.9	123 g sodium acetate and 50 mL glacial acetic acid are given into a 1 L volumetric flask and the flask is filled up to the mark with deion. water.

Analysis

5–15 mL sample solution is pipetted into a 200 mL plastic beaker and 80 mL deion. water is added. After the addition of 10 mL acetate buffer pH 4.9 and 0.5 mL xylenol orange indicator solution the thorium is titrated with c(Na_2EDTA) = 0.1 mol/L until after the first equivalence point.

Parameters

Mode	MET U
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
Stop EP	1
Stop V after EP	2 mL

Results

Mean results (n = 6)

Th^{4+} content / (g/L)	20.42
s(rel) / %	0.74

Metrohm