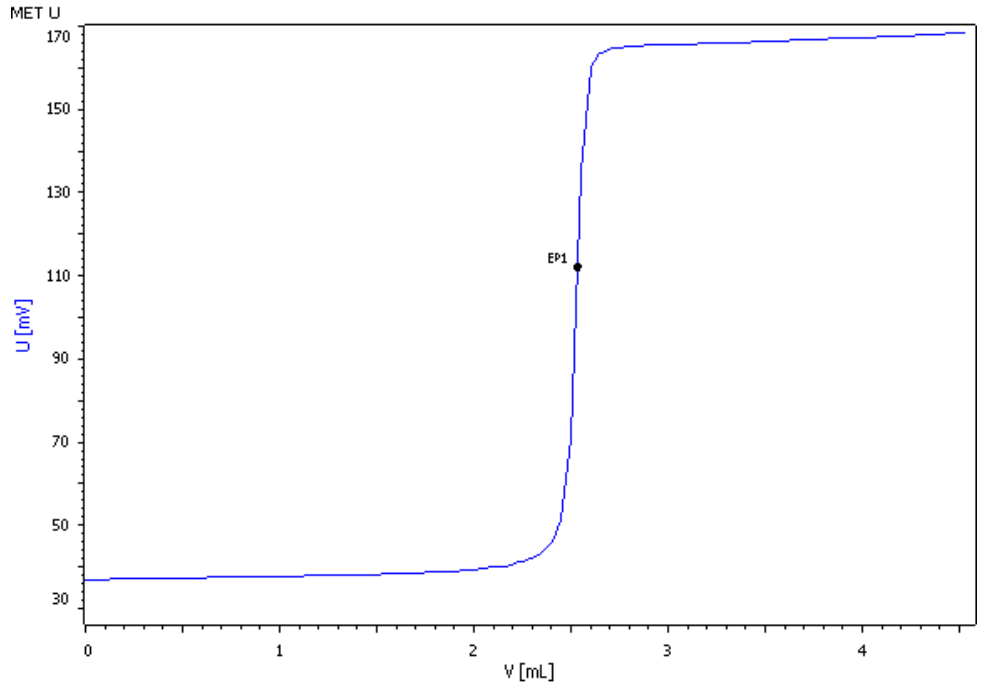
Titration Application Note T-146

Tin analysis using automated photometric titration



Tin forms very stable complexes with EDTA in its divalent and tetravalent form. In alkaline media, tin forms hydroxo complexes for which reason tin is titrated in acidic medium (pH 2.1). 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 tin (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, 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	6.1459.310
Optrode	6.1115.000
Solitrode	6.0220.100

Solutions

EDTA solution	$c(Na_2EDTA)$ = 0.1 mol/L If possible this solution should be bought from a supplier.
Xylenol orange	12 mg xylenol orange is dissolved in 100 mL deion. water.
Buffer pH 2.1	5.88 g citric acid and 3.58 g NaCl are dissolved in 700 mL c(HCl) = 0.1 mol/L and the pH is adjusted with c(NaOH) = 2 mol/L to pH 2.1.

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 buffer pH 2.1 and 0.5 mL xylenol orange indicator solution the tin 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
Stop EP	1
Stop V after EP	2 mL

Results

Mean results (n = 6)

Sn content / (g/L)	6.015
s(rel) / %	0.15