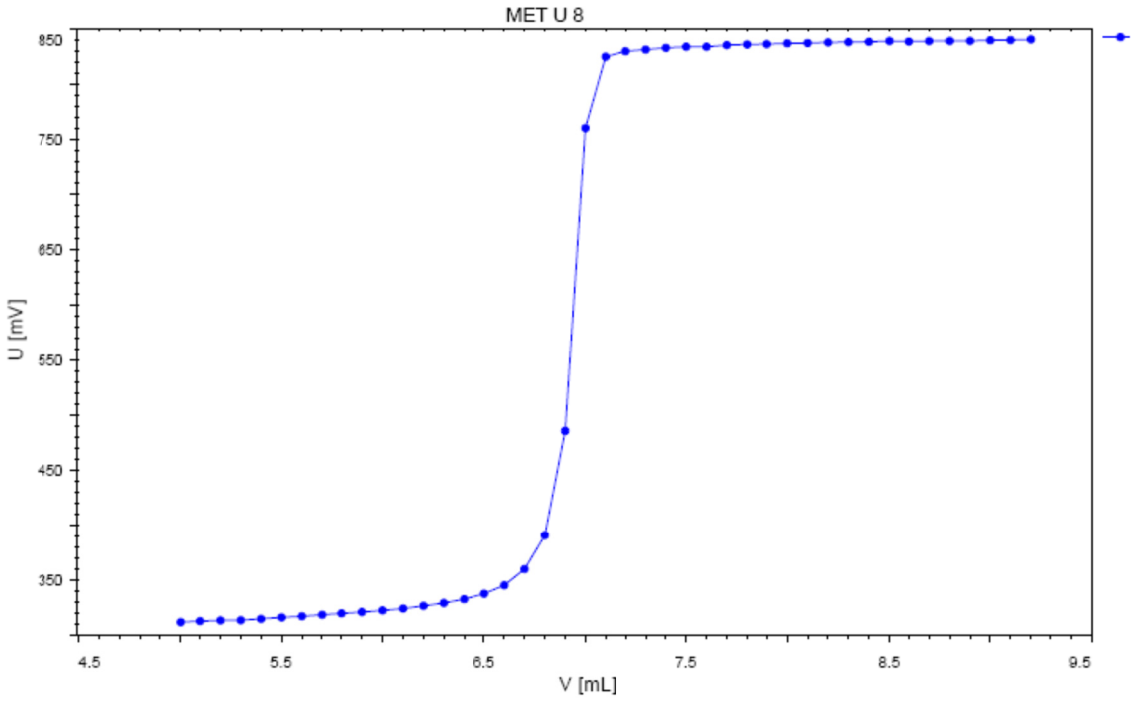
Titration Application Note T–88

Photometric EDTA titration of bismuth subnitrate according to Ph. Eur. and USP



This Application Note deals with the photometric determination of bismuth subnitrate using the Optrode (520 nm). The sample was titrated with an EDTA titrant past the first endpoint; xylenol orange was used as indicator. The method complies with the requirements of Ph. Eur. and USP.

Metrohm

Method description

Sample

Bismuth subnitrate

Sample preparation

No sample preparation required

Configuration

907 Titrando	1 x 2.907.0010
800 Dosino	4 x 2.800.0010
Dosing unit 2 mL	2 x 6.3032.120
Dosing unit 10 mL	1 x 6.3032.210
Dosing unit 50 mL	1 x 6.3032.250
802 Rod Stirrer	1 x 2.802.0020
815 Robotic USB SP	1 x 2.815.0110
Sample beaker 250 mL	1 x 6.1432.320
Sample rack 28 x 250 mL	1 x 6.2041.820
Optrode (at 520 nm)	1 x 6.1115.000

Solutions

Titrant $c(Na_2EDTA)$ = 0.1 mol/L	Dissolve 37.224 g $Na_2EDTA \cdot 2H_2O$ in dist. water, add 10 mL c(NaOH) = 1 mol/L and make up to 1 liter with dist. water.
Nitric acid CAS 7697-37-2	$w(HNO_3)$ = 65%
Xylenol orange indicator CAS 63721-83-5	Dilute 100 mg xylenol orange in 100 mL dist. water

Analysis

Weigh approx. 0.2 g sample into the titration beaker and dissolve under slight heating in 5 mL dist. water plus 2 mL 65% nitric acid. Add 100 mL dist. water and 0.5 mL xylenol orange color indicator and titrate with an EDTA solution (0.1 mol/L) past the first endpoint.

Parameters

Titration mode	MET U
Measurement drift	50 mV/min
Min. waiting time	0 s
Max. waiting time	26 s
Volume increment	0.1 mL
EP criterion	30 mV
EP recognition	greatest
Stirring speed	8

Calculations

1 mL c (Na_2EDTA) = 0.1 mol/L corresponds to 23.30 mg Bi_2O_3

$$\% Bi_2O_3 = EP1 \times C01 \times C02 \times 100/C00$$

EP1 = titrant consumption in mL
C00 = sample weight in mg
C01 = 23.30 mg/mL (1 mL c(Na_2EDTA) = 0.1 mol/L corresponds to 23.30 mg Bi_2O_3
C02 = titer Na_2EDTA (dimensionless unit)

Results

$w(Bi_2O_3)$ in %	
78.78 ± 0.763 (n=6)	

Metrohm