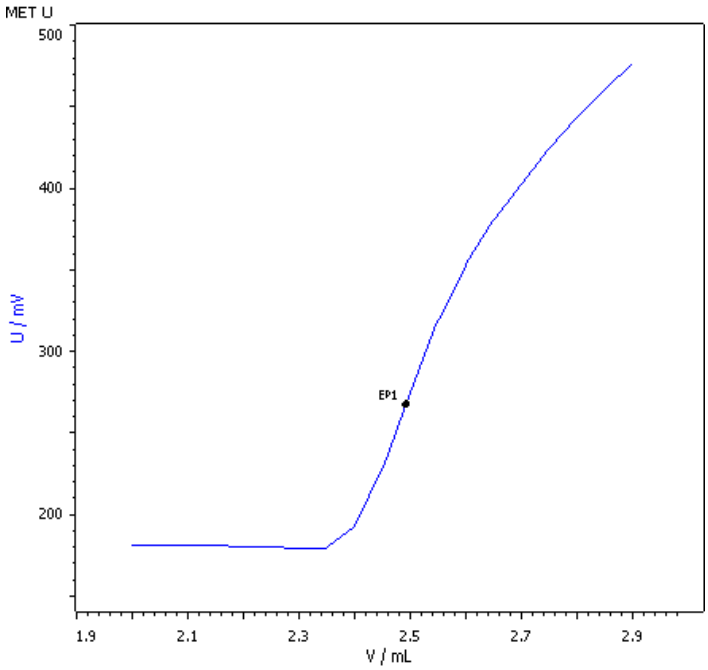
Titration Application Note T-85

Photometric determination of sulfate



The Application Note describes the photometric determination of sulfate using the Optrode (610 nm). Sulfate is titrated with a lead nitrate solution using dithizone as indicator.

Metrohm

Method description

Sample

Sulfuric acid

Sample preparation

No sample preparation is necessary.

Configuration

907 Titrando	2.907.0020
804 Ti Stand	2.804.0040
802 Rod Stirrer	2.802.0020
800 Dosino, 4x	2.800.0010
Dosing unit 5 mL	6.3032.150
Dosing unit 10 mL, 2x	6.3032.210
Dosing unit 50 mL	6.3032.250
Optrode (at 610nm)	6.1115.000
EtOH-Trode	6.0269.100

Solutions

Titrant	$c(Pb(NO_3)_2)$ = 0.01 mol/L Approx. 3.31 g $Pb(NO_3)_2$ is weighed into a 1 L volumetric flask and dissolved in deion. H_2O. The flask is then filled up to the mark with deion. H_2O.
Indicator	Approx. 50 mg dithizone is weighed into a 100 mL volumetric flask and dissolved in acetone. The flask is then filled up to the mark with acetone. The indicator should be prepared freshly every day.
Solvent	Acetone
Nitric acid	Nitric acid, $c(HNO_3)$ = 1 mol/L

Analysis

Add 0.4 mL indicator solution to 5 mL sample solution (smaller aliquots have to be filled up to 5 mL using deion. H_2O). After the addition of 50 mL acetone adjust to pH 2 using a SET titration with $c(HNO_3)$ = 1 mol/L. Then titrate with $c(Pb(NO_3)_2)$ = 0.01 mol/L until after the equivalence point.

Parameters

Titration mode	SET pH
Stirring rate	8
EP1 at pH	2
Titration rate	Slow
Stop criterion	Drift
Stop drift	20 µL/min

Titration mode	MET U
Stirring rate	8
Signal drift	20 mV/min
Max. waiting time	38 s
Volume increment	0.05 mL
EP criterion	20 mV
EP recognition	greatest

Results

Mean result (n = 5)

$\beta(SO_4^{2-})$ in g/L	s(rel)
10.05	1.54%

Metrohm