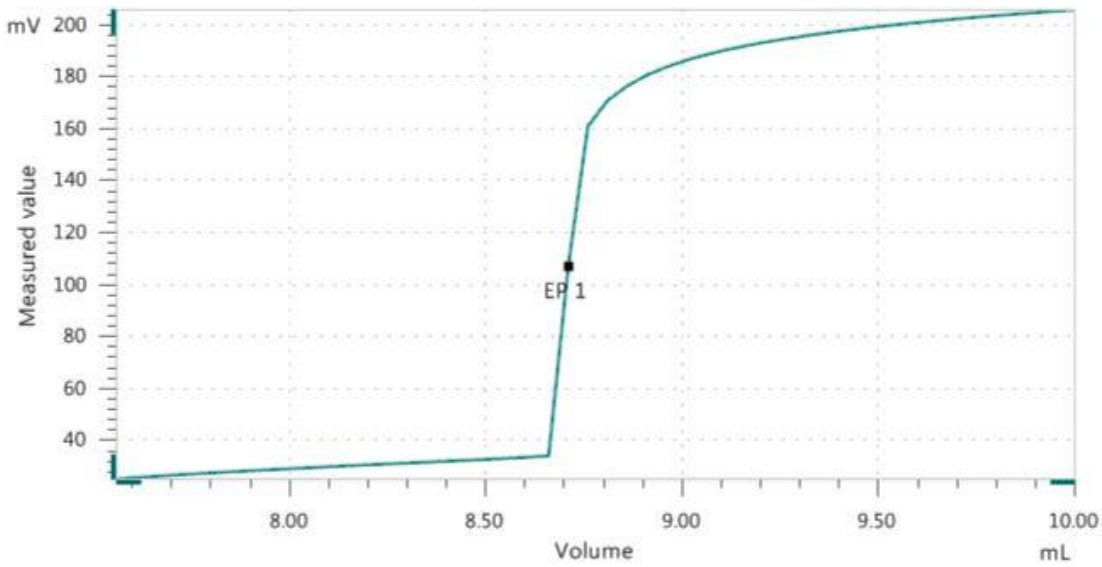
Titration Application Note T-163

Complexometric titration of aluminum chloride using OMNIS system



With the OMNIS system a fast and accurate determination of aluminum in aluminum chloride by a complexometric back-titration with the copper ion-selective electrode is realized. The aluminum content is determined using cupric sulfate as titrant.

Metrohm

Method description

Sample

Aqueous solution of aluminum chloride

Sample preparation

No sample preparation is required.

Analysis

Sample

1.4 mL sample solution is pipetted into the titration vessel and placed on the rack. Just before the titration, approximately 100 mL water, 5 mL acetate buffer and 10 mL EDTA solution are automatically added to the sample. After a reaction time of 3 min the solution is titrated with $c(CuSO_4) = 0.1$ mol/L until after the equivalence point using the Cu-ISE.

Configuration

Main module Pick&Place S	2.1010.0010
Pick&Place module	2.1014.0010
"Peristaltic" (2-channel) pump module	2.1016.0010
Gripper fingers 42.8 - 65 mm	6.02601.010
Dummy panel for module plate	6.02600.000
OMNIS Rod Stirrer "Sample Robot"	2.1006.0010
Titration head 6xNS14 / 3xNS9 (P&P)	6.01403.000
Stirring propeller 30 mm ETFE	6.01900.010
OMNIS sample rack 9 x 250 mL, 2x	6.02041.010
Sample beaker (10x) PP 250 mL (P&P), 2x	6.01400.100
OMNIS Titrator (Advanced)	2.1001.0210
Cable MDL St/Bu 1 m, 3x	6.02102.020
OMNIS Dosing Module, 2x	2.1003.0010
OMNIS 5 mL cylinder unit, (acetate buffer)	6.03001.150
OMNIS 10 mL cylinder unit, 2x (EDTA solution, titrant)	6.03001.210
Analog measuring module	6.02101.010
Cu-ISE	6.0502.140
LL-ISE Reference electrode, Electrolyte c(KCl) = 3 mol/L	6.0750.100
Electrode cable plug-in head G / plug P, 1.5 m	6.02104.010
Electrode cable, strand / 1 m / 2 x B	6.2106.020
OMNIS Stand-alone license (including one instrument license), OMNIS 1.0	6.06003.010
OMNIS instrument license, 1x	6.06002.010

Solutions

Titrant	$c(CuSO_4) = 0.1$ mol/L, if possible this solution should be bought from a supplier.
Acetate buffer	Acetate buffer with pH = 4.7, if possible this solution should be bought from a supplier.
EDTA solution	$c(Na_2EDTA) = 0.1$ mol/L, if possible this solution should be bought from a supplier.

Parameters

Mode	MET U
Pause	30 s
Start volume	Case((10-Sample Size)>0; 10-Sample size-1.0; 0)
Stirring rate	8
Volume increment	50 µL
Signal drift	30 mV/min
Max. waiting time	32 s
Min. waiting time	5 s
Dosing rate	Maximum
Stop volume	10 mL
Stop EP	1
Volume after EP	1.0 mL
EP criterion	5 mV
EP recognition	Greatest

Results

Content $\beta_{Al^{3+}}$ / (g/L) (n = 17)	s(rel) / %
2.32	0.42