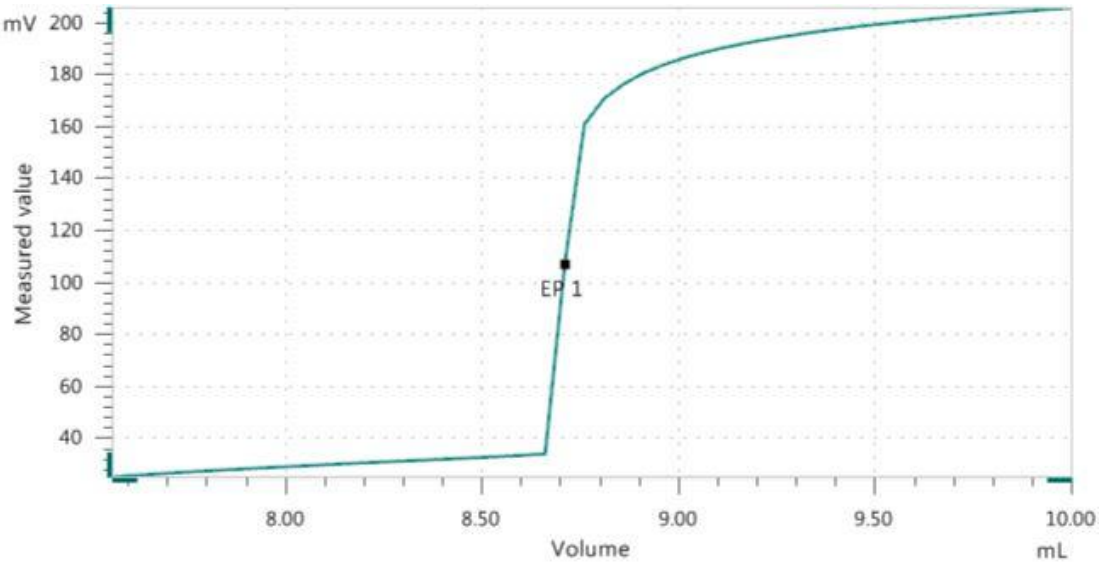
Titration Application Note T-163

Complexometric titration of aluminum chloride using OMNIS



With the OMNIS system, a fast and accurate determination of aluminum in aluminum chloride by complexometric back-titration with a copper ion-selective electrode (Cu-ISE) 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.

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	6.03001.150
OMNIS 10 mL cylinder unit, 2x	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.

Analysis

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.

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