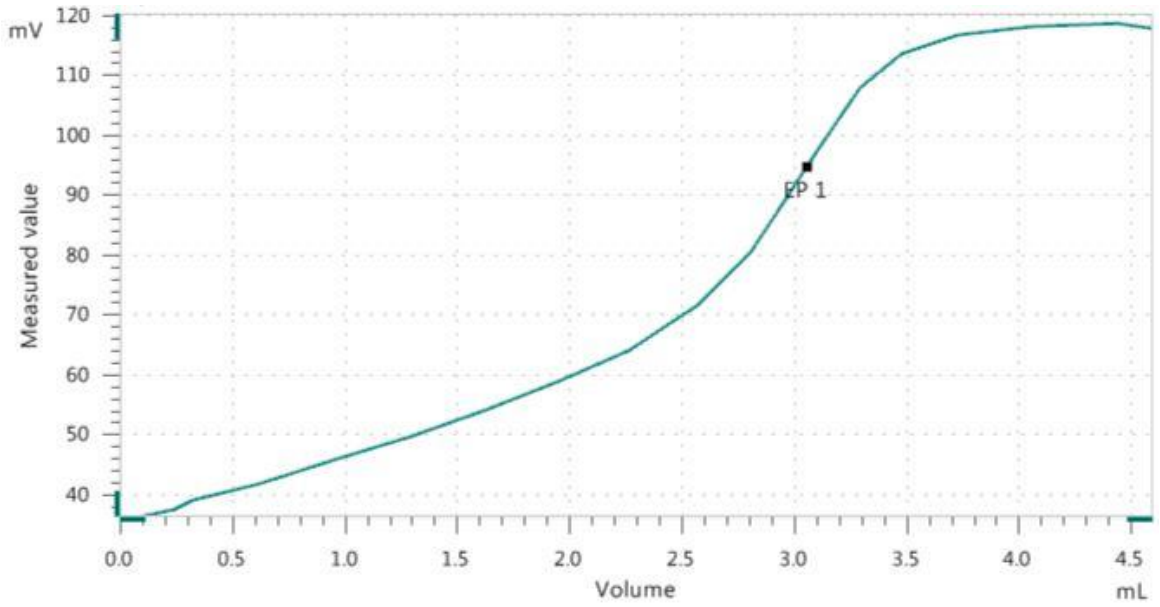
Titration Application Note T-169

Determination of citrate in detergents according to ASTM D4608

Citrate is used in detergents as water softener, preventing calcification. The citrate



content is therefore an important parameter for the quality of detergents and is determined using cupric sulfate as titrant.

Metrohm

Method description

Sample

Liquid hand soap

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 PL/SO 1 m, 4x	6.02102.020
OMNIS Dosing Module, 4x	2.1003.0010
OMNIS 5 mL cylinder unit	6.03001.150
OMNIS 10 mL cylinder unit, 3x	6.03001.210
OMNIS 50 mL cylinder unit	6.03001.250
Analog measuring module	6.02101.010
Cu-ISE	6.0502.140
Unitrode with Pt1000 (Head U)	6.0258.600
Electrode cable plug-in head G / plug P, 1.5 m for Cu-ISE	6.02104.010
Electrode cable plug-in head U / plug P, 1.5 m for Unitrode	6.02104.610
OMNIS Stand-alone license (including one instrument license)	6.06003.010
OMNIS instrument license, 1x	6.06002.010

Solutions

Titrant	$c(CuSO_4)$ = 0.05 mol/L
Borate buffer	Borate buffer with pH = 8.5
EDTA solution	$c(Na_2EDTA)$ = 0.05 mol/L
HCl	c(HCl) = 0.1 mol/L
NaOH	c(NaOH) = 0.1 mol/L

Analysis

5–10 g sample is pipetted into a sample beaker which is placed on the rack. Just before the titration, approximately 150 mL water is automatically added to the sample and the pH is adjusted to approximately 8.5 with c(HCl) = 0.1 mol/L. After 25 mL borate buffer is added and the pH is adjusted again to approximately 8.5 with c(NaOH) = 0.1 mol/L. The solution is titrated with $c(CuSO_4)$ = 0.05 mol/L until after the equivalence point using the Cu-ISE.

Parameters

Mode	DET U
Pause	30 s
Start volume	(Sample size / 2) – 1.5 mL
Stirring rate	8
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	10 mV
EP recognition	Greatest

Results

Content $w_{Citric\ acid}$ / (%) (n = 5)	s(rel) / %
0.40	1.77