



Thermo

ELECTRON CORPORATION

Potentiometric Titration Application Notes

Applications Log # 694

Overview

The concentration of linear alkylbenzene sulfonate (LAS) in the detergent paste is determined using the first derivative titration technique on ORION 960 Titrator with Hyamine 1622 as a titrant and ORION surfactant electrode.

Market	Consumer Products	Species Measured	Linear alkylbenzene sulfonate				
Sample	LAS detergent paste	Sample Size	0.08 g				
		Typical Concentration	84-85% w/w				
Technique #	6 First Derivative	Electrode	Surfactant 9342;	D/J Ref. 90-02			
Solutions	0.05 M Hyamine 1622 (654201); Diluted Triton X-100 (654203); Ref. filling solutions 900002 and 810007						
Solutions preparation:	Use Orion prepared solutions.						
Titrant standardization	0.05 M Hyamine 1622 (Orion 654201) is already standardized.						
Sample Prep	<p>Step 1. Accurately weigh about 0.8 g of the LAS sample to a 250-mL beaker, add 100 mL DI water, mix well until the sample is dissolved. Transfer the solution from the beaker quantitatively into 500 mL volumetric flask and dilute to the mark with DI water.</p> <p>Step 2. Pipette 50 mL of the prepared in Step 1 sample into a beaker. Add 1 mL of Triton X-100. Sample pH about 2.23.</p>						
Statistics							
# of Trials	5	Mean	84.6 %w/w	%CV	0.70	Analysis Time	16 minutes
Comments	Rinse the electrodes, stirrer, and dispenser probe thoroughly between measurements with deionized water.						

Method Parameters

Sample Volume/Weight	0.08 g	Timed or Stability Readings	10.0 mV/min stability
Constant Increment	0.200 mL	Number of Endpoints	1
Max Titrant Volume	5.0 mL	Desired Units	% w/w
Molecular weight	320	Predose	2.2 mL
Prestir	10 seconds	Additional Parameters	
Reaction Ratio	1		



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Results

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METHOD 7 SUMMARY
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TEST: _____
SITE: _____
ANALYST: _____
DATE: 03-14-05 ELECTRODE: 1: X-
TECHNIQUE: 5 FIRST DERIVATIVE
SAMPLE WEIGHT 0.10300 g
TITRANT 0.05000 M of Hyamine
PRE-DOSE VOLUME 4.400 mL
CONST INCREMENT 0.201 mL
MAX TITRANT VOL 8.000 mL
STABILITY CRITERION 10.0 mV/min
PRESTIR 10.0 sec
CONTINUOUS STIRRING
REACTION RATIO 1.0000
MOLECULAR WEIGHT 320.00
NO. OF ENDPOINTS 1
CAL CONSTANT 1.0054
electrode check: +/- 2.4 mV

0 v= 4.424 mL E= 152.3 mV 107 sec
-6.7 mV/min drift +/- 0.3 mV noise
1 v= 4.625 mL E= 159.8 mV 40 sec
2.4 mV/min drift +/- 0.1 mV noise
2 v= 4.826 mL E= 166.9 mV 28 sec
7.7 mV/min drift +/- 0.1 mV noise
3 v= 5.027 mL E= 174.1 mV 28 sec
7.9 mV/min drift +/- 0.3 mV noise
4 v= 5.228 mL E= 183.3 mV 40 sec
7.2 mV/min drift +/- 0.3 mV noise
5 v= 5.429 mL E= 210.5 mV 112 sec
7.4 mV/min drift +/- 0.2 mV noise
6 v= 5.630 mL E= 256.0 mV 171 sec
8.0 mV/min drift +/- 0.2 mV noise
7 v= 5.831 mL E= 301.2 mV 136 sec
4.5 mV/min drift +/- 0.1 mV noise
8 v= 6.033 mL E= 310.5 mV 40 sec
8.7 mV/min drift +/- 0.1 mV noise

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0 dE/dv=	36.9	d2E/dv2=	+3.
1 dE/dv=	36.2	d2E/dv2=	-2.
2 dE/dv=	35.7	d2E/dv2=	11.
3 dE/dv=	40.7	d2E/dv2=	136.
4 dE/dv=	90.4	d2E/dv2=	348.
5 dE/dv=	180.9	d2E/dv2=	336.
6 dE/dv=	225.6	d2E/dv2=	-112.
7 dE/dv=	135.3	d2E/dv2=	-445.
8 dE/dv=	45.4	d2E/dv2=	-443.

SAMPLE = 86.9 %w/w
 END POINT VOL= 5.597 mL (248.2 mV)
 Excess Titre= 0.436 mL
 Signal/Noise= 26

