Quantitative determination of cationic surfactant

Sheet No.:	**GT200-DE034E**	Category	Detergent
Method	Acid-base titration		
Apparatus:	Automatic Titrator model GT-200 (GT0EF) Electrodes: Reference electrode, double junction (GTRE10B) － *Inner solution:1mol/l Potassium chloride *Outer solution:1mol/l Potassium nitrate Electrode for detergent (GTSS11B)	Related standard：	JISK3362-2008 Test Method of Household Synthetic, Detergent/Qualitative and quantitative analysis of cationic surfactant
Titration mode	INF, Detection: pH / mV		

*This application sheet is provided as reference, and does not assure the measurement results. Please consider analysis environment, external factors and sample nature for optimal conditions before the measurement.

Outline

Hydrophilic groups of cationic surfactants are positively charged when cationic surfactants are dissolved in water and they are absorbed to negatively-charged substances. Cationic surfactants have softening, bactericidal and antistatic properties, being used for products such as hair washing agents, fabric softeners and disinfectants.

Reagents

[Titrant] ■ 0.004mol/L-sodium lauryl sulfate in water

Analytical procedure

(1) Dilute 2g sample (cationic surfactant) with pure water to 1L total. Use this solution as a sample solution.
(2) Collect 10ml sample solution using a whole pipette and add it into a 100ml beaker.
(3) Add approximately 60ml pure water. (A quantity which makes a surfactant electrode immerse in the water)
(4) Titrate with 0.004mol/L-sodium lauryl sulfate solution while agitating.
(5) Perform a blank measurement in the same way

[Calculation]

Cationic surfactant (%) = (A1 – BL) × M × f × FW × 10/S

A1: Titration volume of 0.004mol/L-sodium lauryl sulfate solution at sample titration (ml)
BL: Titration volume of 0.004mol/L-sodium lauryl sulfate solution at blank measurement (ml)
M: Molar concentration of 0.004mol/L-sodium lauryl sulfate solution
f: Factor of 0.004mol/L-sodium lauryl sulfate solution
FW: Formula weight of sample (cationic surfactant)
10: Unit conversion factor
S: Sample volume (g)

Other requirement

- Make sure to confirm labels and safety data sheets of reagents and gases used for the measurement and handle them with enough care.
- Wear protective equipment (eye protector, gloves and others) when handling reagents.
- Conditioning of an electrode is required when a surfactant electrode is used. For the conditioning method, refer to the instruction manual for the surfactant electrode.

Measurement results

	Sample size (g)	Titration volume (ml)	Results (%)
1	2.0372	11.0723	97.6
2		11.1055	97.9
3		11.0579	97.5

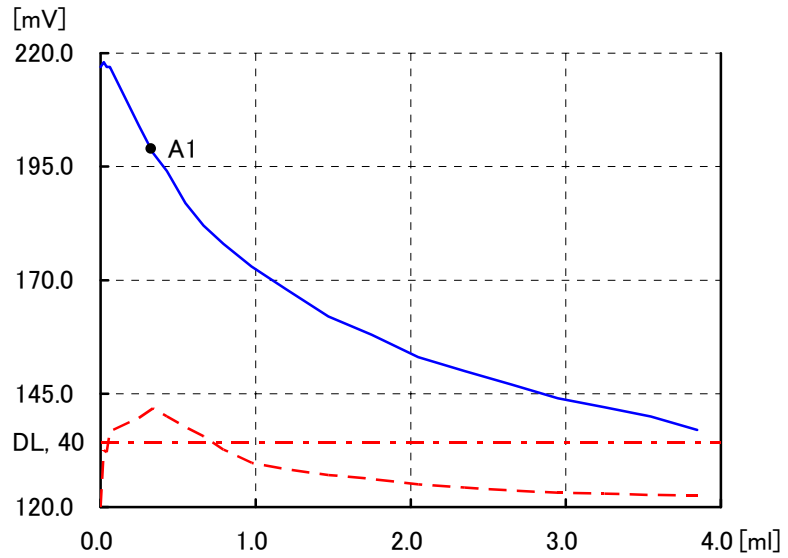
Blank: 0.3237ml

Nos. of data	(n)	3
Average		97.7
Standard deviation	(SD)	0.22
Relative standard deviation	(RSD%)	0.23

Determinate quantities of cationic surfactant were measured using GT-200. The average of three measurements was 97.7% and the relative standard deviation (RSD %) was 0.23%. GT-200 can measure determinate quantities with good repeatability.

ID No. : 4 GT No.1 User : GT-200

Measurement : 2015/05/26 15:15 Type : Sample Titr
Sample name : Blank test Sample size(S) : 1 [g]



C1 : 0.3237 [ml]

A1 : 0.3237 [ml] 199 [mV]

Initial potential (Pi) :	217	[mV]			
Start :	0	[ml]	217	[mV]	
End :	3.848	[ml]	137	[mV]	Measurement Time : 1’57”

Run file No. : 11 Concentration of surfactant
Titration file No. : 38 Concentration of surfactant *Run file and Titration file parameters are set for each analysis item

Mode	: INF	End1, End1 Width : 300 [mV] ± 200 [mV]	
Detect	: mV1		
BRT No.	: 1		
Reagent	: 37		
WTint	: 10	[sec]	
Vup	: 300	[µl]	
Vlow	: 20	[µl]	
dE	: 5	[mV]	
dT	: 5	[sec]	
DL	: 40	[mV/ml]	
DetCnt	: 3		
Vmax	: 50	[ml]	
Vover	: 0.5	[ml]	C1 : A1

[ml]

Reagent (Reag) : SDS Equivalent (E) : 1 Molarity(M) : 0.004 [Mol/l]
Factor(f) : 1

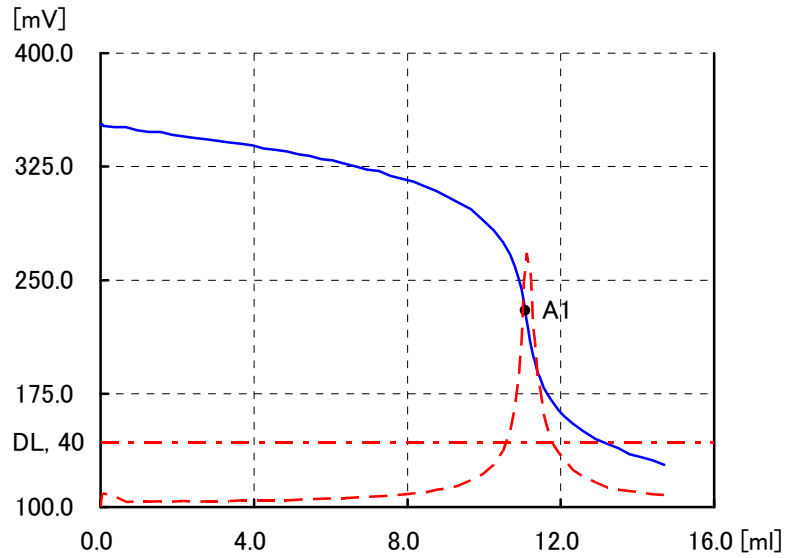
Buret Injection Speed : 400 [ul/sec]

Sheet No. :GT200-DE034E

ID No. : 1 GT No.1 User : GT-200

Measurement : 2015/05/26 14:22
Sample name : Cation surfactant

Type : Sample Titr
Sample size(S) : 2.0372 [g]



C1 : 97.59 [%]

A1 : 11.0723 [ml] 230 [mV]

Initial potential (Pi) : 353 [mV]
Start : 0 [ml] 353 [mV]
End : 14.698 [ml] 128 [mV] Measurement Time : 6'32"

Run file No. : 11 Concentration of surfactant
Titration file No. : 38 Concentration of surfactant *Run file and Titration file parameters are set for each analysis item

Mode : INF
Detect : mV1
BRT No. : 1
Reagent : 36
WTint : 10 [sec]
Vup : 300 [µl]
Vlow : 20 [µl]
dE : 5 [mV]
dT : 5 [sec]
DL : 40 [mV/ml]
DetCnt : 20
Vmax : 50 [ml]
Vover : 0.5 [ml]

End1, End1 Width : 300 [mV] ± 200 [mV]

C1 : (A1-BL)*M*f*FW*10/S [%]

Reagent name (Reag) : SDS
Factor(f) : 1.032
Formula weight (FW) : 448.09

Equivalent (E) : 1
Blank (BL) : 0.3237 [ml]

Molarity(M) : 0.004 [Mol/l]

Buret Injection Speed : 400 [ul/sec]