

HIRANUMA APPLICATION DATA	Automatic Titrator	Data No.	C1	Jun. 30, 2020
Detergents • Bath additives • Cosmetics	Determination of anion surfactant in detergent			

1. Abstract

The determination method of anion surfactant uses a cation surfactant, with an opposite charge, as the titrant. The end point is the point at which the charge becomes neutral due to the reaction between the anion and the cation. Benzethonium chloride is used as the cation standard solution.

This report introduces an example of determination of anion surfactant, sodium alkylbenzene sulfonate, in detergent by potentiometric titration using a surfactant electrode as an indicator electrode.

2. Configuration of instruments and reagents

(1) Configuration of instruments

Main unit	:	Hiranuma Automatic Titrator COM series	
Electrodes	:	Surfactant electrode	SU-091
	:	Reference electrode	RE-201Z

(2) Reagents

Titrant	:	0.004 mol/L Benzethonium chloride standard solution
		Dissolve 0.896 g of benzethonium chloride in DI water and prepare 500 mL solution.

3. Measurement procedure

- (1) Take 5 g of sample and accurately weigh it then record the reading of balance.
- (2) Dissolve the sample with DI water and transfer into 500 mL volumetric flask to prepare 500 mL of sample solution.
- (3) Take 10 mL of sample solution into 100 mL beaker with volumetric pipette.
- (4) Add 50 mL of DI water.
- (5) Immerse electrodes and start titration with 0.004 mol/L benzethonium chloride standard solution.

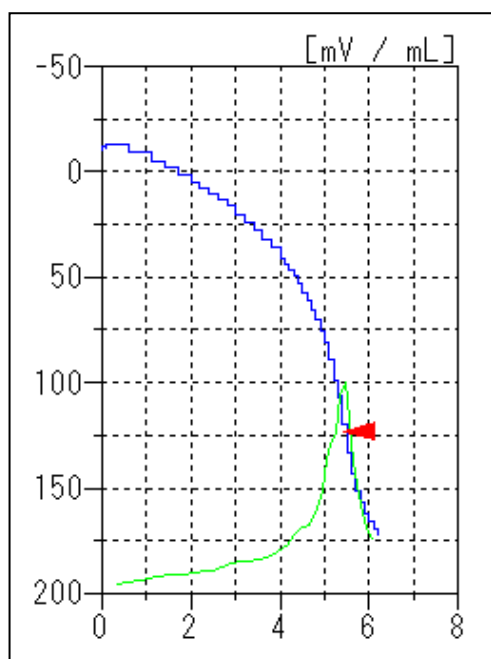
4. Measurement conditions and results

Example of titration condition

Cndt No.	1	Constant No.	1	Mode No.	21
Method	Auto	Size	4.9985 g	Pre Int	0 sec
Buret No.	1	Blank	0 mL	Del K	5
Amp No.	2	Molarity	0.004 mol/L	Del Sens	0 mV
D. Unit	mV	Factor	0.9595	Int Time	10 sec
S-Timer	30 sec	K ※1	348	Int Sens	3 mV
C.P. mL	0 mL	L ※2	0.02	Brst Speed	2
T Timer	0 sec	Unit	%	Pulse	40
D.P. mL	0 mL	Formula			
End Sens	100		$(D-B)*K*F*M/(S*L*10)$		
Over mL	0.5 mL	Digits	3		
Max. Vol.	10 mL				

※1 Set the molecular weight "348" for coefficient K to convert it as concentration of sodium dodecylbenzene sulfonate.

※2 Dilution ratio of sample solution. Prepare 500 mL of sample solution with dissolving 5 g of sample and take 10 mL aliquot of prepared solution.



Example of titration curve

Measurement results

Meas. No.	Size (g)	Titrant volume (mL)	Conc. (%)	Statistic calculation	
1		5.427	7.251	Avg.	7.27 %
2	4.9985	5.435	7.261	SD	0.019 %
3		5.454	7.287	RSD	0.26 %

5. Note

(1) Electrode

Depending on the type of sample, as the titration progresses, deposits may form on the electrodes and the potential may become unstable. In that case, it is effective to reduce the sampling amount in order to suppress the generation of deposits on the electrode.

(2) Standardization of benzethonium chloride

Standardizing the benzethonium chloride standard solution enables more accurate measurement. The standardization method for benzethonium chloride is described below. The procedure is to standardize it with sodium dodecyl sulfate as a standard solution, whose purity was previously determined by neutralization titration. (Refer to application data C11 for details of the standardization method)

Keywords: Anionic surfactant, Surfactant electrode, Sodium alkylbenzene sulfonate, Benzethonium chloride