KEM **Application Note** №TIZ-99074

Inorganic Chemical

Quantification of Sodium Chloride

Precipitation titration by
Automatic Potentiometric Titrator

Standard	JIS K 8150	

1.Abstract

Quantification of Sodium chloride is made by titration with 0.1mol/L Silver nitrate according to JIS K 8150-2006 Sodium Chloride（Reagent）up to the endpoint, which is the maximum inflexion point on titration curve.

Concentration of Sodium chloride is calculated from titration volume of Silver nitrate.

2.Reference

1) JIS K 8150-2006 Sodium Chloride（Reagent）
2) “Experiment and Calculation for Quantitative Analysis ” –Vol.2 by Seiji Takagi from Kyoritsu Publishing Company
3) Japanese Pharmacopoeia codex 15 “Quantitative Method for Sodium Chloride

3.Cautions in measurement

1) When the test sample contains a small amount of chlorine, it is necessary to titrate in alcoholic solvent not aqueous solvent to raise sensitivity of electrode.
2) Add nitric acid if titration liquid before titration with silver nitrate does not show acidity.

4.Post-measurement care

Polish sensor element of silver electrode with supplied polishing paper (for electrode).

5.Test equipment

Main unit：Automatic potentiometric titrator (Standard preamplifier STD-)
Electrode：Option Silver electrode
Option Mercury sulfate reference electrode

6.Reagent

Titrant : 0.1mol/L Silver nitrate solution（f=1.001）
Solvent : Pure water

7.Measurement procedure

—Measurement—
1) Deliver 10.0mL sample into a 200mL beaker.
2) Add 100mL pure water.
3) Titrate with 0.1mol/L Silver nitrate to obtain concentration of Sodium chloride.

8.Formula

Concentration of NaCl (mol/L) = (EPl － BLK) × F × Cl × K1 / Size

EPl : Titration volume (mL)
BLK : Blank level (0.00mL)
F : Factor of titrant (1.001)
Cl : Concentration conversion coefficient (0.1)
(1mL of 0.1mo1/L $AgNO_3$ ≡ 0.1mmo1 NaCl)
Kl : Unit conversion coefficient (1)
Size : Sample size (mL)

9.Example of measurement

－Ambient condition－

Room temperature : 23 ℃	Humidity : 38 %	Weather : Fair

- Titration parameter -

Model : AT-500
Method No. : 02
Titr.mode : Auto
Intermit
Titr.form : EP

[Titration parameter]

Titr.Form : EP
Buret No. : 1
Preamp : STD
Detector No. : 2
Unit : mV
Max.Volume : 20.0mL
Titr. Wait : 0s
Direction : Auto

[Control parameter]

End Point No. : 1
Gain : 1
Ctrl Speed : Medium
End sense : Auto
Sampling mV : 4.0mV
Sampling mL : 0.5mL

<Calculation>

Sample Measurement

Conc. 1
Calculation No. : 03
End Point No. : 1
Unit : [mol/L]
Coefficient1 : 0.1
Blank1 : 0.0mL
Factor1 : 1.001
EP Data : Epn-Blank

- Titration curve -

*** R e s u l t ***

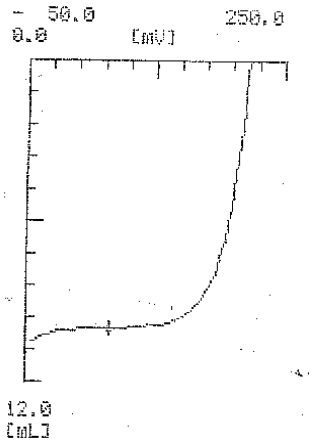
Sample No. : 02-01
Date : 1997/03/12 15:55
Sample ID :
Method No. : 02
<Auto Intermit Titr.>
Method Name :

I.Level 195.3mV
F.Level - 43.7mV
Titr. Time 00:10:48

Size 10.0mL

Conc-1 .10017mol/L

EP-1 10.0073mL
47.0mV



(The above printout data are obtained from titration by AT-500)

≪Titration parameter≫
Form: of titration / APB No. the burette used in titration / Unit No.: APB Unit File number
Detector No.: the detector used in titration/ Unit of potential / Max Volume: of titration
Wait Time: before titration starts/ Direction.: of titration
≪Control parameter≫
End Point No.: number of EPs / Gain: sensitivity of detection signal / Ctrl Speed: of titration
End sense: of EP detection /Sampling mV: of data sampling potential/ Sampling mL: of data sampling volume
≪Calculation parameter≫
Calcu No.: of concentration formula 1/ End Point No.: EP number of concentration calculation
Unit: conversion unit / Coefficient1: conversion 1 / Blank1: blank level
Factor1 of titrant / EP Data: calculation method of titration volume

－Measurement results－

n	Sample (mL)	Titration (mL)	NaCl (mol/L)
1	10.0	10.0073	0.10017
2		10.0023	0.10012
3		10.0389	0.10049
4		10.0362	0.10046
5		10.0312	0.10041

Concentration of Sodium chloride	
Mean	0.10037 mol/L
SD	0.00013 mol/L
RSD	0.12766 %

＊The above results were obtained by 3 tests of the same sample.
＊ Red underline shows the data from page 3/4.

10.Summary

Sodium chloride (NaCl) is an ionic substance, indispensable and vital mineral for most of living things on earth.

The test result shows a good repeatability with 0.13% relative standard deviation.
Precise and reliable measurement is assured by the automated potentiometry.
The analysis of Sodium chloride can be perfectly made by any of the following titration systems manufactured by Kyoto Electronics (KEM).

【AT-610】

Awarded Product of Supreme Technology from Kyoto City

- Easy key entry by touch panel of large color LCD（8-inch wide）
- Simultaneous titration in parallel
- Both potentiometric and Karl Fischer moisture titration（coulometric・volumetric）can be performed at a time.

【AT-510】

- Compact and cost performance model
- PC card expands data memory for convenience and versatility.

【AT-500N-1】

- Low cost and high performance
- Easy view with back light LCD
- GLP/GMP conformed model

KEM KYOTO ELECTRONICS MANUFACTURING CO.,LTD.

Overseas Division: Yamawaki Bldg 9F,4-8-21 Kudan-minami,Chiyoda-ku,
Tokyo 102-0074 JAPAN
Phone: +81-3-3239-7333, Fax: +81-3-3237-0537
Head Office: 56-2 Ninodan-cho,Shinden,Kisshoin,Minami-ku,
Kyoto 601-8317 JAPAN
Phone: +81-75-691-4122, Fax: +81-75-691-9961
URL: http://www.kyoto-kem.com