

Paint, Adhesive

Chloride of Dyestuff

Precipitation titration by
Automatic Potentiometric Titrator

Standard

JIS K 8150

1. Abstract

Chloride ion of dyestuff (Cl^-) is measured by potentiometric titration with 0.01mol/L silver nitrate solution. When concentration of chloride is of trace, it is measured by addition method with sodium chloride.

Chloride ion concentration is calculated from titration volume of silver nitrate titrant. The added sodium chloride is deducted from previously obtained result.

2. Reference

- 1) JIS K 8150-2006 Sodium Chloride (Reagent)
- 2) "Experiment and Calculation in 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) Add nitric acid if the liquid does not show acidity before titration.

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 : Silver electrode

Mercury sulfate reference electrode

6. Reagent

Titrant : 0.01mol/L Silver nitrate solution (f=1.00)

Additive : Pure water, 0.01mol/L Sodium chloride solution

7. Measurement procedure

—Pretreatment—

- 1) Add 50mL pure water to 10.0mL of 0.01mol/L sodium chloride.
- 2) Titrate with 0.01mol/L silver nitrate, and obtain titration volume of silver nitrate for 10.0mL of 0.01mol/L sodium chloride.
(0.01mol/L NaCl 10mL \equiv 0.01mol/L AgNO₃ 10.790mL)

—Measurement—

- 1) Deliver 0.5g ample to a 100mL beaker.
- 2) Add 50mL pure water and 10.0mL of 0.01mol/L sodium chloride.
- 3) Titrate with 0.01mol/L silver nitrate to obtain chlorine.

8. Formula

Chloride (ppm) = (EP1 - BL1) × FA1 × C1 × K1 / SIZE

EP1 : Titration volume (mL)

BL1 : Blank level (10.790mL)

FA1 : Factor of titrant (1.00)

C1 : Concentration conversion coefficient (0.355 mg/mL)
(Cl⁻ in mg equivalent to 1mL of 0.01mol/L AgNO₃)

K1 : Coefficient (1000)

SIZE : Sample size (g)

9. Example of measurement

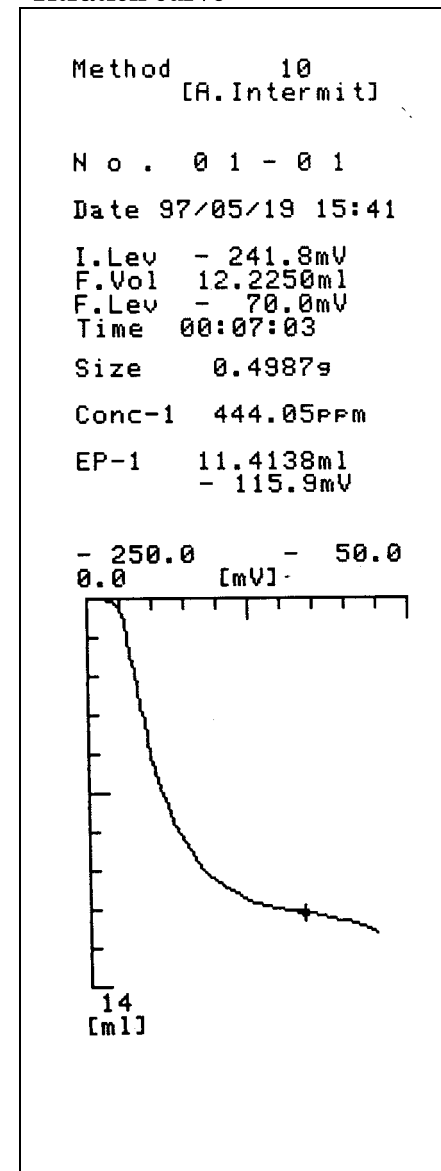
— Ambient condition —

Room temperature : 22 °C	Humidity : 44 %	Weather : Cloudy
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- Titration parameter -

Model : AT-400	
Method No. : 10	
Titr.mode : Auto	
Intermit	
Titr.form : EP Stop	
[TITR. PARA]	[CALCU. PARA]
Form : EP Stop	Sample Measurement
Buret No. : 1	Conc1 CalcuNo. 2
Preamp : STD	Conc1 Dim. [ppm]
Detector No. : 2	Conc1 EP Position 1
Dimension : mV	Data [f(EP2-Blank)]
Max.Vol : 20.0mL	T.Type [Normal]
W.Time : 0s	Data [f(T.Vol)]
Direction : Auto	Local Blank
	Blank 10.790mL
	Common T.Factor
	K1 1000
	C1 0.355mg/mL
	Temp.Comp. [Off]
[CTRL. PARA]	
End Point No. : 1	
S(dE) : 50	
S(E/mL) : 50	
O.Titr : 0mL	
Gain : 1	
S.Pot : 4.0mV	
Stab. : 0.5mV/s	
Delay Time : 1s	
L.Time : 30s	
M.Unit : 0.5mL	
Separation : Off	
A.Simulation : Off	

- Titration curve -



(The above printout data are obtained from titration by AT-400)

«TITR. PARA:Titration parameter»

Form: of titration / Buret No.: the burette used in titration / Detector No.: the detector used in titration
Dimension: potential unit/ Max Volume: of titration /Wait Time: before titration starts /Direction.: of titration

«CTRL. PARA:Control parameter»

End Point No. number of EPs detected / S(dE): EP potential (difference) / S(E/mL): EP potential (differential)
O Titr.: over-titration volume /Gain: sensitivity of detection signal/ S.Pot.: potential changes of sampling signal
Separation: of potential / Stab.: stability sense/ Delay Time: **before stability check**
L.Time: time for stability check/M.Unit: titration for sampling signal / A.Simulation: redetection of EP

«CALCU. PARA Result parameter»

Calc.No.: of formula / Conc.1: formula 1 / Dim: unit of result/Conc1EP Position. EP at concentration 1
Data: calculation of titration / T.Type: titration type (normal or back)/K1: unit conversion coefficient
Blank : blank level /Common T.Factor: factor of titrant registered
C1(mg/mL): concentration conversion of EP1/ Temp.Comp. temperature compensation

–Measurement results–

N	Sample (g)	Titration (mL)	Chloride (ppm)	Results of statistical calculation	
				Mean	
1	<u>0.4987</u>	<u>11.4138</u>	<u>444.05</u>	Mean	440.99 ppm
2	<u>0.4890</u>	<u>11.3892</u>	<u>435.00</u>	SD	5.19 ppm
3	<u>0.5039</u>	<u>11.4201</u>	<u>443.91</u>	RSD	1.18 %

* The above results were obtained by 3 tests of the same sample.

* Red underline shows the data from page 3/4.

10. Summary

Dyestuff is colored substance, which is used to dye fabrics or paper usually by dissolving in solvent (typically water). Those not dissolved in solvent and dispersed in medium are called colorant or pigment.

The test result shows a good repeatability with less than 1.2% relative standard deviation.

Precise and reliable measurement is assured by the automated potentiometric titration.