

Sheet No.

GT200-WA029E Water

Determination of total alkalinity of tap water (T alkalinity/M alkalinity)

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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
Glass electrode (GTPH1B)
Titration mode : SET-P, Detection: pH
Related standard : Standard Methods for the Examination of Water, Japan
Water Works Association: Alkalinity, Total alkalinity of tap water

*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

Alkalinity is determined by titrating a water sample with a strong acid (such as chlorine and sulfuric acid) and expressed by the calcium carbonate content (mg/L) corresponding to the amount of acid consumed until the pH value reaches the prescribed value. Alkalinity measured with the end point of pH4.8 is called total alkalinity (or T alkalinity or M alkalinity).

Reagents

[Titrant]

■ 0.01mol/L-sulfuric acid solution (Volumetric analysis grade)

[Reagents]

■ pH standard solution (pH 4, 7 and 9)

Analytical Procedure

- (1) Perform pH calibration using pH standard solution before measurement.
- (2) Collect 100ml tap water using a whole pipette and add it into a 200ml beaker.
- (3) Titrate with 0.01mol/L-sulfuric acid solution. **(MODE:SET-P, END1: pH4.8)**

[Calculation]

Total alkalinity (CaCO_3 mg/L) = $A1 \times (1000 / S) \times 1$

A1 : Titration volume of 0.01mol/L-sulfuric acid solution until the end point (pH4.8) (ml)

1000 : Unit conversion factor (ml/L)

S : Sample volume (ml)

1 : Calcium carbonate content equivalent to 1ml of 0.01mol/L-sulfuric acid solution (mg)

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Other Requirements

- Set tap water at room temperature.
- 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.

Measurement Results

	Sample size (g)	Titration volume (ml)	Results (CaCO ₃ mg/l)
1	100	4.6900	47.0
2		4.7388	47.4
3		4.7563	47.6

Nos. of data (n) 3
Average 47.3
Standard deviation (SD) 0.29
Relative standard deviation (RSD%) 0.62

Total alkalinity of tap water was measured using GT-200. The average of three measurements was 47.3mg/L and the relative standard deviation (RSD %) was 0.62%. GT-200 can measure total alkalinity of tap water with good repeatability.

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ID No. : 3 GT No.1

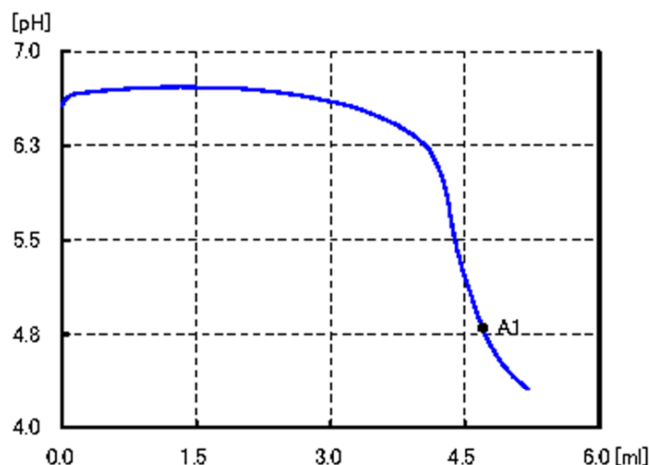
User : GT-200

Measurement : 2014/12/03 15:01

Sample name : Tap water

Type : Sample Titr

Sample size(S) : 100 [ml]



C1 : 46.99 [mg/L]

A1 : 4.699 [ml] 4.8 [pH]

Initial potential (Pi) : 6.575 [pH]

Start : 0 [ml] 6.575 [pH]

End : 5.212 [ml] 4.302 [pH]

Time : 2'48"

Run file No. : 19 Total alkalinity of tap water

Titration file No. : 53 Total alkalinity of tap water

*Run file and Titration file parameters are set for each analysis item

Mode : SET-P End1 : 4.8 [pH]

Detect : pH

BRT No. : 1

Reagent : 1

WTint : 10 [sec]

Vup : 200 [μl]

Vlow : 20 [μl]

dE : 0.1 [pH]

dT : 3 [sec]

Vmax : 50 [ml]

Vover : 0.5 [ml]

C1 : $A1 \times (1000/S) \times 1$

[mg/L]

Reagent name (Reag) : 0.01M H₂SO₄ Equivalent (E) : 2 Molarity(M) : 0.01 [Mol/l]

Factor (f) : 1

Buret Injection Speed : 500 [ul/sec]