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Water quality - Determination of permanganate index

水质 高锰酸盐指数的测定

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Water quality - Determination of permanganate index

This Standard refers to the International Standard ISO 8467-1986 Water quality -- Determination of permanganate index.

1 Subject and scope

1.1 Subject

This Standard specified the method for determination of permanganate index in water.

1.2 Scope

This Standard is applicable to the determination of drinking water, water-source water and ground water. The determination scope is 0.5 ~ 4.5 mg/L. For heavy-polluted water, it shall take few water sample for determination after dilution.

This Standard is not applicable to the determination of the amount of organic pollution in industrial waste. If the determination is required, potassium dichromate can be used to determine the chemical oxygen demand.

The inorganic reducing substances in sample such as NO_2^-, S^{2-} and Fe^{2+} can be determined. When chloride ion concentration is greater than 300 mg/L, it shall use the method for the determination of oxidation in alkaline media.

2 Definition

The permanganate index is a common indicator of the contamination of organic and inorganic oxidizable substances in water. It is defined as: under certain conditions, the equivalent amount of oxygen calculated by the potassium permanganate content consumed by using certain organic and inorganic reducing substances in potassium permanganate oxidizes water sample.

The permanganate index can not be used as an indicator of theoretical oxygen demand or total organic matter content because under certain conditions, many organic matters can only be partially oxidized; volatile organic matter is not included in the measured value.

4.8 Potassium permanganate standard solution, concentration C_3 (1/5 $KMnO_4$) of about 0.01 mol/L: pipet 100 mL of potassium permanganate standard stock solution (4.7) in a 1000 mL volumetric flask; use water to dilute to the scale; well mix. This solution can be stored in the dark for several months. Use the same day to calibrate its concentration.

5 Apparatus

5.1 Commonly used laboratory instruments and the following instruments.

5.2 Water bath or equivalent heating device: with enough volume and power.

5.3 Acid burette, 25 mL.

NOTE The new glassware must be cleaned with acidic potassium permanganate solution.

6 Sample storage

After sampling, add sulfuric acid (4.3) to make sample pH 1~2 and analyze as soon as possible. If the storage time exceeds 6h, it needs storing in a dark place at 0~5°C. Must not exceed 2 days.

7 Analysis steps

7.1 Pipet 100.0 mL of sample that has been thoroughly shaken and well mixed (or pipet appropriate amount for several times; use water to dilute to 100 mL). Place in a 250 mL conical flask. Add 5 ± 0.5 mL of sulfuric acid (4.3). Use a burette to add 10.00 mL of potassium permanganate standard solution (4.8). Shake well. Place the conical flask in a boiling water bath for 30 min (starts timing when water bath boils).

7.2 After removal, use a burette to add 10 mL of sodium oxalate solution (4.6) till the solution turns colorless. When it is still heated, use potassium permanganate solution (4.8) to titrate till pink just appears and maintain for 30s. Record the volume of potassium permanganate solution consumed.

7.3 Blank test: use 100 mL of water to replace sample; determine according to 7.1, 7.2; record the volume of potassium permanganate solution dropped (4.8).

7.4 Add 10.00 mL of sodium oxalate solution (4.6) into the solution that has been titrated by the blank test (7.3). If necessary, heat the solution to 80°C. Use potassium permanganate solution (4.8) to carry out the continuous titration till pink just appears and maintain for 30s. Record the volume of

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