GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 71.060.01

G 10

GB 23769-2009

Inorganic Chemical Products - General Method for the Determination of pH Values

无机化工产品 水溶液中 pH 值测定通用方法

Issued on: May 13, 2009 **Implemented on: January 01, 2010**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine;

Standardization Administration of PRC.

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Inorganic Chemical Products - General Method for the Determination of pH Values

1 Scope

This Standard specifies the principles, safety tips, general provisions, reagents, apparatus, and analytical procedures for the determination of the pH value of aqueous solutions of inorganic chemical products by the potentiometric method.

This Standard is applicable to the determination of the pH value of aqueous solutions of inorganic chemical products. The measurement range of pH value is 1~12.

2 Normative References

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 6682-2008 Water for Analytical Laboratory Use – Specification and Test Methods (ISO 3696:1987, MOD)

HG/T 3696.1 Inorganic Chemicals for Industrial Use - Preparations of Standard and Reagent Solutions for Chemical Analysis - Part 1: Preparations of Standard Volumetric Solutions

HG/T 3696.3 Inorganic Chemicals for Industrial Use - Preparations of Standard and Reagent Solutions for Chemical Analysis - Part 3: Preparations of Reagent Solutions

3 Principle

Immerse the specified indicator electrode and reference electrode or composite electrode in the same test solution to form a primary cell whose electromotive force is related to the pH value of the solution. The pH value of the solution may be obtained by measuring the electromotive force of the primary cell.

7 Apparatus

7.1 Electrode (see Appendix A for the use of electrodes):

7.1.1 Indicator electrode: glass electrode;

7.1.2 Reference electrode: calomel electrode;

7.1.3 Composite electrode.

7.2 Acidity meter: the graduation value is 0.02.

8 Analysis Procedures

8.1 Preparation of test solution

Prepare the sample into a test solution with certain concentration by the carbon dioxide-free water according to the requirements of the product standard.

8.2 Calibration of acidity meter

Prepare two standard buffer solutions at the same time; so that the pH value of one standard buffer solution is greater than and close to the pH value of the test solution, and the other standard buffer solution is less than and close to the pH value of the test solution. Calibrate the pH meter by the above two standard buffer solutions. Adjust the temperature compensation knob to the temperature of the standard buffer solution; and refer to the pH value of the standard buffer solution at this temperature. Use two standard buffer solutions to calibrate respectively; the calibration error shall be no greater than 0.1 (if greater than 0.1, the electrode needs to be cleaned or replaced). Use a standard buffer solution whose pH value is close to that of the sample test solution to position.

8.3 Determination

Rinse the electrode with water; then wash with the test solution; adjust the temperature of the test solution to 25°C±1°C; and adjust the temperature compensation knob of the acid meter to 25°C. Insert the electrode into the test solution; add a stir bar; under stirring state (or according to the specific requirements of the product standard), determine the pH value of the test solution; and the measured pH value shall be stable for at least 1min. Divide the solution into 2 portions and measure them respectively. The difference between the two measured pH values shall be no greater than ±0.02.

Avoid acid or alkaline gas intrusion during operation.

Take the arithmetic average of the parallel determination results as the determination

Appendix A

(Informative)

Precautions for Electrode Use

A.1 Glass electrode

Soak the temporarily-unused glass electrodes in water, and change the water frequently. The glass electrode that has not been used for a long period of time shall be stored in a dry place; and it needs to be immersed in water for 24h in advance to activate it before use.

When measuring the pH value, all the bulbs of the glass electrode shall be immersed in the solution; and slightly higher than the ceramic core of the calomel electrode.

A.2 Calomel electrode

When calomel electrode is in use, the rubber plug of the small hole at the top of the electrode shall be pulled out to prevent diffusion potential from affecting the test results.

There shall be no bubbles in the potassium chloride solution in the electrode to prevent disconnection. A small amount of potassium chloride crystals shall be kept in the solution to ensure the saturation of the potassium chloride solution; but the potassium chloride crystals shall not be too much to prevent blocking the electrode and the passage of the measured solution.

When potassium chloride solution or crystals are attached to the surface of the electrode, it shall be rinsed with water at any time.

A.3 Composite electrode

The protective cap on the lower end of the electrode shall be removed during use. Avoid contact of the sensitive glass bulb of the electrode with hard objects to prevent the electrode from failing. Put on the electrode protective cap after use; and put a small amount of external reference replenishing solution (3mol/L potassium chloride solution) in the cap to keep the electrode bulb moist.

If it is found that the replenisher in the protective cap is dry before use, it shall be immersed in 3mol/L potassium chloride solution for several hours to ensure the electrode performance.

When using, pull out the rubber plug or rubber sleeve of the small hole at the upper end of the electrode to prevent the generation of diffusion potential and affect the measurement result. When the electrode is not in use, the hole shall be blocked to

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