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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 9725-2007

Replacing GB/T 9725-1988

Chemical reagent -- General rule for potentiometric titration

化学试剂 电位滴定法通则

(English Translation)

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Foreword

This standard and ISO 6353-1. 1982 "Chemical Analysis Reagents Part 1. Common test methods" consistency is not equivalent.

This standard replaces GB/T 9725-1988 "chemical reagent potentiometric titration method", compared with GB/T 9725-1988 main changes as follows.

- Modify the principle of the method (see Chapter 3);
- Improve the accuracy of the instrument (1988 version of 5.2, this version of 5.2,5.3);
- Increased composite electrode (version 5.4);
- Elimination of antimony electrodes and tungsten electrodes (1988 edition of 5.3.1.2,5.3.2.3);
- Modify the schematic diagram of the instrument (1988 version 6.1, version 5.1);
- Modify the contents of Appendix A (see Appendix A);
- Canceled Appendix B, Appendix C (1988 edition of Appendix B, Appendix C).

Appendix A of this standard is an informative annex.

This standard is proposed by China Petroleum and Chemical Industry Association.

This standard by the National Standardization Technical Committee Chemical Reagent Branch (SAC/TC63/SC3) centralized.

This standard was drafted. Guangzhou Chemical Reagent Factory.

1 Scope

This standard specifies the method by measuring the electrode potential to determine the end point of titration.

This standard applies to acid-base titration, sedimentation titration, redox titration and non-titration. Particularly suitable for turbid, colored solution titration and titration analysis methods that lack suitable indicators.

2 Normative references

The following documents contain provisions which, through reference in this standard and become the standard terms. All dated references, which are subsequently owned Amendments (not including errata content) or revisions do not apply to this standard, however, encourage the parties to reach an agreement based on this standard research Whether you can use the latest versions of these files. For undated references, the latest version applies to this standard.

GB/T 601 chemical reagent standard titration solution preparation GB/T 6682 analytical laboratory water specifications and test methods (GB/T 6682-1992, neq ISO 3696. 1987)

3 Method principle

The specified instruction electrode and reference electrode immersed in the same solution under test, the titration process, the reference electrode potential remains constant, the fingers the potential of the electrode changes with the concentration of the tested substance. Before and after the stoichiometry, the concentration of the measured substance in the solution changes, can cause Steep changes in the electrode potential indicate that the sudden change in the electrode potential is the end point of the titration.

4 Reagents and materials

The standard titration solution used in this standard prepared according to GB/T 601 regulations, the experimental water should be consistent with the three water GB/T 6682 specification.

5.1 Potentiometric titration device

Potentiometric titration device shown in Figure 1.

5.2 Potentiometer

Potentiometer accuracy of $\pm 2\text{mV}$.

5.3 Acidity meter

The accuracy of pH meter is ± 0.02 .

5.4 Electrode

See Appendix A for electrode selection.

This standard specifies.

- a) glass electrode for indicating electrode, silver electrode and platinum electrode;
- b) saturated calomel electrode for reference electrode, double salt bridge saturated calomel electrode;
- c) Composite electrode.

5.5 Electromagnetic stirrer

- 1 --- Burette;
- 2 --- indicating electrode;
- 3 --- reference electrode;
- 4 --- beaker
- 5 --- test solution;
- 6 --- electromagnetic stirrer;
- 7 --- potentiometer or pH meter;
- 8 --- display window.

Figure 1 potentiometric titration device

6.1 Determination methods

Sampling according to the provisions of the product standards and preparation of test solution. Insert the specified electrode, start the electromagnetic stirrer, with the provisions of the standard titration solution into Line titration. From the burette, a standard titration solution of about 90% of the desired titration volume is added and the potential or pH of the

solution is measured.

After each drop plus 1mL or standard titration solution to measure a potential or pH, before and after the stoichiometry, 0.1mL per drop should be added Quasi-titration solution, measured once. Continue to titrate until the potential or pH changes little. Record each drop after dropping standard titration solution the tube readings and measured potentials or pH values are used as a plot or second-order derivative to determine the titration endpoint.

6.2.1 Mapping method

The titration curve is plotted using the mV or pH of the indicator electrode as the ordinate and the reading of the burette (mL) as the abscissa. Do two and the abscissa 45 ° titration curve tangential line, and in the two tangent line with a tangent distance equal to the parallel line, the line with the titration curve the intersection point is the titration end point (see Figure 2). The abscissa of intersection point is the dosage of standard titration solution when titration end point, and the ordinate of intersection point is drop Set the end of the potential or pH.

1 --- titration curve;

2 --- tangent

3 --- parallel equidistance line;

4 --- titration end.

Figure 2 titration end point curve

6.2.2 Second-level micro-business law

Buret reading (mL) and the corresponding potential E (mV) or pH are tabulated and the following values calculated.

The volume of standard titration solution is applied dropwise (Δ).

Changes in potential or pH (ΔE or ΔpH) each time a standard titration solution is dropped.

A level of micro-value. That is, the change of potential or pH value caused by standard titration solution per unit volume is equal to $\Delta E/\Delta$ or $\Delta pH/\Delta$.

Second-level derivative. Numerically equal to the difference between adjacent first derivative.

First derivative, the second derivative is equal to zero when titration end.

The volume of the standard titration solution titration end point to 0, the value expressed in milliliters (mL), according to equation (1) Calculated.