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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 31197-2026

Replacing GB/T 31197-2014

Inorganic chemicals for industrial use - Determination of impurity ions - Ion chromatography

无机化工产品 杂质离子的测定 离子色谱法

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. This document replaces GB/T 31197-2014 "Determination of Anions in Inorganic Chemical Products by Ion Chromatography" and is consistent with GB/T Compared to 31197-2014, aside from structural adjustments and editorial changes, the main technical changes are as follows:

a) The scope has been changed (see Chapter 1, Chapter 1 of the.2014 edition);

b) The definition of ion chromatography has been changed (see 3.1,.2014 edition);

c) The inhibitor regeneration solution, post-column derivatization reagent, and microporous filter membrane were added (see 5.4-5.7);

d) Some parts of the injection system have been modified (see 6.2.2,.2014 version of 6.2.2);

e) The type of detector in the detection system has been changed (see 6.2.5,.2014 version of 6.2.5);

f) The requirements for the inner diameter and length of the separation column have been removed (see

6.4.1 in the.2014 edition);

g) The requirements for the stationary phase have been changed (see 6.3.2,

6.4.2 of the.2014 edition);

h) Some parts of the experimental procedures have been changed (see Chapter 7,

7.3 of the.2014 edition);

i) The resolution requirements have been changed (see 11.1.3,.2014 version 11.1.3);

1 Scope

GB/T 31197-2026 is the Chinese national standard covering the anions and cations that contaminate an industrial inorganic chemical - chloride, sulfate, nitrate, fluoride and the alkali metals - determined together by ion chromatography instead of one at a time by wet chemistry. It replaces GB/T 31197-2014 and has been in force since 1 October 2026. It was issued on 31 March 2026 and takes effect on 1 October 2026, replacing GB/T 31197-2014. The document is under the responsibility of the China Petroleum and Chemical Industry Federation. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document specifies the principles, reagents or materials, instruments, test procedures, and qualitative methods for determining impurity ions in inorganic chemical products using ion chromatography. Analysis, quantitative analysis, representation of measurement results, evaluation of measurement results, etc. This document applies to the quantitative determination of impurity anions and cations in inorganic chemical products using ion chromatography.

4.Principles The sample is prepared into a sample solution, enters the chromatographic column, and is eluted with eluent. The analytes are determined according to their different retention characteristics on the chromatographic column. The particles are separated and eventually carried to the detector by the eluent, forming Gaussian-distributed chromatographic peaks. Qualitative analysis is based on retention time, while peak area (or peak height, etc.) is used for identification. Quantitative.

5.1 General Rules

5.1.1 Unless otherwise specified, the standard titration solutions, preparations, and products used in the test shall conform to GB/T 601 and GB/T 603. Prepared according to regulations.

5.1.2 Unless otherwise stated, the term "solution" in this document refers to an aqueous solution.

5.1.3 All impurity standard solutions, eluents, inhibitor regeneration solutions, and derivatization reagents used in this document were prepared using analytical grade reagents. The reagents used for the sample should be of analytical grade.

5.1.4 The impurity standard solution should be stored in a cool, dry place. The shelf life of sealed storage is generally 6 months. If turbidity, precipitation, or discoloration occurs, the solution should be removed. If there are any changes, it should be prepared again.

5.1.5 Cyanide standard solution, nitrite ion standard solution, carbonate ion standard solution, chlorate standard solution and chlorite standard solution The prepared solution should be prepared immediately before use.

5.1.6 Diluted impurity standard solutions and mixed diluted standard solutions should be prepared and used immediately. When preparing mixed diluted standard solutions, the mixture should not be mixed with other materials. The resulting precipitates or turbid solutions mix together.

5.2 Water Deionized water with an electrical conductivity (at 25°C) of no more than 0.0055 mS/m (equivalent to a resistivity of no less than

5.3 Impurity Standard Solution Prepare impurity ion standard solutions according to Appendix A, or use certified standard substances.

5.4 Rinsing solution

5.4.1 Basic requirements for rinsing solution Select the rinsing solution according to the following requirements.

a) The fixation of the separation column should not be compromised;

b) Suitable for separating the analyte ions;

c) Suitable for detector detection;

d) When using suppressors and derivative devices, their performance requirements can be met;

e) It can maintain chemical stability for a long time.

5.4.2 Preparation of Eluent The eluent should be degassed after preparation, or it can be prepared using pre-degassed water. The eluent should be stored in a cool, dark place to prevent bacterial or algal growth. Reproduction of the species. Commonly used rinsing solutions are listed in Appendix B.

5.5 Suppressor Regeneration Fluid After continuous use of the suppression device, it should be regenerated using suppression regeneration fluid. Commonly used suppression regeneration fluids include sulfuric acid and hydrogen sulfide. Potassium oxide or sodium hydroxide, tetrabutylammonium hydroxide, lithium chloride. The eluent, suppressor type,

and suppressor selection depend on the properties of the sample. To use, select the self-circulating regeneration inhibitor mode, external water mode, or regeneration liquid mode for regeneration.

5.6 Post-column derivatization reagents Commonly used post-column derivatization reagents include metal derivatization reagents, chromate derivatization reagents, and bromate derivatization reagents. The appropriate reagent is selected based on the properties of the analyte ion. Post-column derivatization reaction was carried out using appropriate reagents.

5.7 Microporous Filter Membranes 0.22μm or 0.45μm microporous filter membrane.

6 Instruments

6.1 Composition of the Ion Chromatograph An ion chromatograph typically includes a solution delivery system, an injection system, a separation system, an inhibition or derivatization system, a detection system, and data processing and control. The system includes a waste liquid collection tank and may also include auxiliary devices such as a gradient eluent generator and a bubble eliminator (e.g., a vacuum degassing device). Typical separation... Figure 1 shows the composition of the subchromatograph.

6.2.1 Infusion System

6.2.1.1 Storage tank The storage tank should be resistant to the corrosion of the rinsing solution and should not contaminate the rinsing solution. Its material should preferably be high-density polyethylene (HDPE) or polytetrafluoroethylene (PTFE). Borosilicate glass, etc.

6.2.1.2 Degassing device The degassing unit should be able to continuously remove air dissolved in the eluent, providing a stable flow rate and baseline. Common degassing methods for degassing units... See Appendix C for the law.

6.2.1.3 Infusion Pump 6.2.1.3.1 Constant Flow Pump A constant flow pump can uniformly deliver the eluent to the separation system. The constant flow pump should meet the following requirements.

a) Uniform flow rate and high precision;

b) Sufficient infusion pressure;

c) Low pulsating flow velocity;

d) Adjustable flow rate;

e) The connecting parts in contact with the liquid are resistant to the corrosion of the rinsing solution and do not contaminate the rinsing solution;

f) Easy to change the rinsing solution. 6.2.1.3.2 Gradient Pump This includes a control