

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Water Quality - Determination of Water Soluble Cations(Li+, Na+, NH₄⁺, K+, Ca²⁺, Mg²⁺) - Ion Chromatography

水质 可溶性阳离子 (Li⁺、Na⁺、NH₄⁺、K⁺、Ca²⁺、Mg²⁺) 的测定 离子色谱法
(发布稿)

(English Translation)

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Foreword

In order to implement the Environmental Protection Law of the People's Republic of China and the Law of the People's Republic of China on the Prevention and Control of Water Pollution, Barrier to human health, regulate the determination of soluble cations in water, the development of this standard.

This standard specifies the determination of six soluble cations in water (Li, Na, NH₄⁺, K, Ca²⁺, Mg²⁺) law.

This standard is the first release.

Appendix A and Appendix B of this standard are informative.

This standard is organized by the Ministry of Environmental Protection Science and Technology Standards Division.

The drafting unit of this standard. Gansu Province Environmental Monitoring Center Station.

The standard verification unit. Xiamen University School of Chemistry and Chemical Engineering, Guangzhou University Analysis and Testing Center, Gansu Province Jiayuguan City Environmental Protection Monitoring station, Beijing Physical and Chemical Analysis and Testing Center, Inner Mongolia Hulunbeier City Environmental Monitoring Station, Guangdong Environmental Protection Engineering Vocational Courtyard and Gansu Province Zhangye City Environmental Monitoring Station.

The environmental protection department of this standard approved on July 26, 2016.

This standard has been implemented since October 1, 2016.

This standard is explained by the Ministry of Environmental Protection.

Water soluble cation (Li, Na, NH₄, Ca²⁺, Mg²⁺) was determined by ion chromatography

1 Scope of application

This standard specifies the determination of soluble cations in water (Li, Na, NH₄, K, Ca²⁺, Mg²⁺) Spectrum method.

This standard applies to surface water, groundwater, industrial wastewater and domestic sewage in the six kinds of soluble cation (Li, Na, NH₄, K, Ca²⁺, Mg²⁺).

When the injection volume of 25 µl, the method of 6 kinds of soluble cation method detection limit and determination of the lower limit in Table 1.

Table 1 Method Detection limit and lower limit of determination (mg/L)

Ion name Li Na NH₄

K Ca²⁺ Mg²⁺

method

The detection limit

0.01 0.02 0.02 0.02 0.03 0.02 Determination of the lower limit of 0.04 0.08 0.08 0.08 0.12
0.08

2 Normative reference documents

The contents of this standard refer to the following documents or their terms. Any annotated file that does not specify the date, its valid version Applicable to this standard.

Technical Guidance for Water Quality Sampling Technical specification for surface water and wastewater monitoring Technical specification for groundwater environmental monitoring

3 Principle of the method

Water samples in the cation, the cationic column exchange separation, inhibition or non-inhibitory conductivity detector detection, According to the retention time qualitative, peak height or peak area quantification.

4 Interference and elimination

4.1

Some of the hydrophobic compounds in the sample may affect the chromatographic separation and column life. RP Column or C18 column treatment to eliminate or reduce its

impact.

4.2

on the retention time similar to the two kinds of cations, when the concentration difference between the larger and low concentration of ions measured, Excessive dilution, adjust the flow rate, change the eluent ratio, etc. to eliminate or reduce interference.

5 Reagents and materials

Unless otherwise stated, analytical reagents conforming to national standards are used for analysis. Experimental water for the resistivity $\geq 18 \text{ Mohm} \cdot \text{cm}$ (25 ° C) and filtered through a 0.45 μm microporous membrane.

5.1

concentrated nitric acid (HNO_3). excellent grade pure, $\rho = 1.42 \text{ g/ml}$.

5.2

lithium nitrate (LiNO_3). excellent grade, should be used before the $105^\circ\text{C} \pm 5^\circ\text{C}$ dry constant weight, placed in a dryer to save.

5.3

sodium nitrate (NaNO_3). excellent grade pure, should be used before the $105^\circ\text{C} \pm 5^\circ\text{C}$ dry constant weight, placed in the dryer in the insurance Save 5.4 ammonium chloride (NH_4Cl). excellent grade, should be used before the $105^\circ\text{C} \pm 5^\circ\text{C}$ dry constant weight, placed in a dryer to save.

5.5

potassium nitrate (KNO_3). excellent grade, should be used before the $105^\circ\text{C} \pm 5^\circ\text{C}$ dry constant weight, placed in a dryer to save.

5.6

calcium nitrate [$\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$]. excellent grade pure, should be placed in the dryer before the balance 24 h.

5.7

magnesium nitrate [$\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$]. excellent grade, should be placed in the dryer before use for 24 h.

5.8

Methanesulfonic acid. ($\text{CH}_3\text{SO}_3\text{H}$) $\geq 99\%$.

5.9

Nitric acid solution. $c(\text{HNO}_3) = 1 \text{ mol/L}$.

Remove 68.26 ml of concentrated nitric acid (5.1) slowly adding water, dilute to 1000 ml

with water and mix well.

5.10

Lithium ion standard stock solution. $\rho(\text{Li}) = 1000 \text{ mg/L}$.

Weigh 9.9337 g of lithium nitrate (5.2) dissolved in the amount of water, the whole volume into the 1000 ml volumetric flask, diluted with water volume to mark, mix well. Transferred to the polyethylene bottle, in the 4 °C below the cold, dark and sealed can be stored for 6 months. Also available for purchase Buy a commercially available standard material.

5.11

sodium ion standard stock solution. $\rho(\text{Na}) = 1000 \text{ mg/L}$.

Weigh 3.6977 g sodium nitrate (5.3) dissolved in the amount of water, the whole volume into 1000 ml volumetric flask, diluted with water volume to mark, mix well. Transferred to the polyethylene bottle, in the 4 °C below the cold, dark and sealed can be stored for 6 months. Also available for purchase Buy a commercially available standard material.

5.12 Ammonium ion standard stock solution. $\rho(\text{NH}_4)$

$) = 1000 \text{ mg/L}$.

Weigh 2.9654 g ammonium chloride (5.4) dissolved in the amount of water, the whole volume into the 1000 ml volumetric flask, diluted with water volume to mark, mix well. Transferred to the polyethylene bottle, in the 4 °C below the cold, dark and sealed can be stored for 6 months. Also available for purchase Buy a commercially available standard material.

5.13 potassium ion standard stock solution. $\rho(\text{K}) = 1000 \text{ mg/L}$.

Weigh 2.5857 g potassium nitrate (5.5) dissolved in the amount of water, the whole volume into the 1000 ml volumetric flask, diluted with water volume to mark, mix well. Transferred to the polyethylene bottle, in the 4 °C below the cold, dark and sealed can be stored for 6 months. Also available for purchase Buy a commercially available standard material.

5.14 Calcium ion standard stock solution. $\rho(\text{Ca}^{2+}) = 1000 \text{ mg/L}$.

Weigh 5.8919 g calcium nitrate (5.6) dissolved in the amount of water, the whole volume into the 1000 ml volumetric flask, add 1.00 ml Nitric acid solution (5.9), diluted with water volume to the mark, mix. Transferred to the polyethylene bottle, at 4 °C below the cold, avoid Light and seal can be stored for 6 months. You can also purchase commercially available certified materials.

5.15 magnesium standard stock solution. $\rho(\text{Mg}^{2+}) = 1000 \text{ mg/L}$.

Weigh 10.5518 g magnesium nitrate (5.7) dissolved in the amount of water, the whole volume into the 1000 ml volumetric flask, add 1.00 ml Nitric acid solution (5.9), diluted with