

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

HJ 1005-2018

**Ambient air - Determination of cations (Na^+ , NH_4^+ , K^+ , Mg^{2+} ,
 Ca^{2+}) in precipitation - Ion chromatography**

环境空气 降水中阳离子 (Na^+ 、 NH_4^+ 、 K^+ 、 Mg^{2+} 、 Ca^{2+}) 的测定 离子色谱法
(English Translation)

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Foreword

To protect the "Environmental Protection Law of the People's Republic of China" and the "Air Pollution Control Law of the People's Republic of China" State environment, ensuring human health, standardizing the determination method of cations (Na, NH₄, K, Mg₂, Ca₂) in precipitation Set this standard.

This standard specifies ion chromatography for the determination of cations (Na, NH₄, K, Mg₂, Ca₂) in precipitation.

Appendix A and Appendix B of this standard are informative annexes.

This standard is the first release.

This standard is formulated by the Department of Eco-Environmental Monitoring, the

Department of Regulations and Standards of the Ministry of Ecology and Environment.

This standard was drafted. China Environmental Monitoring Station.

This standard is verified by. Liaoning Provincial Environmental Monitoring Experimental Center, Inner Mongolia Autonomous Region Environmental Monitoring Center Station, Taiyuan City Ring Environmental Monitoring Center Station, Nanchang Environmental Monitoring Station, Yangzhou Environmental Monitoring Center Station, Zhanjiang Environmental Protection Monitoring Station and Chongqing Shapingba District Environmental Monitoring Station.

This standard is approved by the Ministry of Ecology and Environment on December 26, 2018.

This standard has been implemented since June 1, 2019.

This standard is explained by the Ministry of Ecology and Environment.

1 Ambient air precipitation cation (Na, NH₄

, K, Mg₂, Ca₂)

Determination of ion chromatography Warning. The chemical reagents such as nitric acid and methanesulfonic acid used in the experiment have strong corrosiveness and irritancy.

The process shall be carried out in a fume hood; the protective equipment shall be worn as required to avoid inhalation of the respiratory tract or contact with skin and clothing.

1 Scope of application this standard specifies ion chromatography for the determination of cations (Na, NH₄, K, Mg₂, Ca₂) in precipitation.

This standard applies to the determination of five cations (Na, NH₄, K, Mg₂, Ca₂) in precipitation.

When the injection volume is 25 µl, the detection limits of Na, NH₄, K, Mg₂, and Ca₂ are 0.02 mg/L, respectively.

0.02 mg/L, 0.03 mg/L, 0.02 mg/L and 0.03 mg/L, the lower limit of determination is 0.08 mg/L, 0.08 mg/L, 0.12 mg/L, 0.08 mg/L, and 0.12 mg/L.

2 Normative references

This standard refers to the following documents or their terms. For undated references, the valid version applies to this standard.

GB 13580.2 Collection and preservation of atmospheric precipitation samples HJ/T 165 acid deposition monitoring technical specification

3 Principle of the method

The target ions in the precipitation sample are separated from the eluent by the eluent and detected by a conductivity detector.

Qualitative, peak height or peak area quantified.

4 Interference and elimination

Two kinds of ions with similar retention times can be adjusted by adjusting the flow rate when the concentration difference is large and affects the determination of low concentration ions.

Eliminate interference by changing the ratio of eluent.

5 Reagents and materials

Unless otherwise stated, the analysis uses a grade of pure reagent that meets national standards. Experimental water is resistivity $\geq$

18.2 Mohm·cm (25 ° C), freshly prepared deionized water.

5.1

Nitric acid. $\rho(\text{HNO}_3) = 1.42 \text{ g/ml}$.

5.2

Sodium chloride (NaCl).

2 Dry the constant weight at $105^\circ\text{C} \pm 5^\circ\text{C}$ before use, and store in a desiccator.

5.3

Ammonium chloride (NH_4Cl).

After drying at $105^\circ\text{C} \pm 5^\circ\text{C}$ for constant weight before use, it is stored in a desiccator.

5.4

Potassium chloride (KCl).

After drying at $105^\circ\text{C} \pm 5^\circ\text{C}$ for constant weight before use, it is stored in a desiccator.

5.5

Calcium chloride (CaCl_2).

After drying at $105^\circ\text{C} \pm 5^\circ\text{C}$ for constant weight before use, it is stored in a desiccator.

5.6

Magnesium chloride (MgCl_2).

After drying at $105^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for constant weight before use, it is stored in a desiccator.

5.7

Methanesulfonic acid. $w(\text{CH}_3\text{SO}_3\text{H}) \geq 98\%$.

5.8

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

Pipette 68 ml of nitric acid (5.1) slowly into water, dilute to 1000 ml with water, and mix.

5.9

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

Accurately weigh 2.5435 g of sodium chloride (5.2) dissolved in a small amount of water, transfer to a 1000 ml volumetric flask, and dilute to volume with water.

To the marking line. Transfer to a plastic reagent bottle, sealed at 4°C or less, and stored for 6 months. You can also buy a commercially available certificate.

standard solution.

5.10

Ammonium ion standard stock solution. $\rho(\text{NH}_4) = 1000 \text{ mg/L}$.

Accurately weigh 2.9722 g of ammonium chloride (5.3) dissolved in a small amount of water, transfer to a 1000 ml volumetric flask, and dilute to volume with water.

To the marking line. Transfer to a plastic reagent bottle, sealed at 4°C or less, and stored for 6 months. You can also buy a commercially available certificate.

standard solution.

5.11

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

Accurately weigh 1.9102 g of potassium chloride (5.4) dissolved in a small amount of water, transfer to a 1000 ml volumetric flask, and dilute to volume with water.

To the marking line. Transfer to a plastic reagent bottle, sealed at 4°C or less, and stored for 6 months. You can also buy a commercially available certificate.

standard solution.

5.12

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

Accurately weigh 2.7750 g of calcium chloride (5.5) dissolved in a small amount of water, transfer to a 1000 ml volumetric flask, add 1.00 ml Nitric acid solution (5.8), dilute to the mark with water. Transfer to plastic reagent bottle, cold and light sealed below 4°C , Save