

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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**Ambient air - Determination of the water soluble anions (F-, Cl-,
Br-, NO₂-, NO₃-, PO₄³⁻, SO₃²⁻, SO₄²⁻) from atmospheric
particles - Ion chromatography**

环境空气 颗粒物中水溶性阴离子（F-、Cl-、Br-、NO₂-、NO₃-、PO₄³⁻、SO₃²⁻、SO₄²⁻）的测定 离子色谱法

(English Translation)

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Foreword

This standard is formulated for the purpose of implementing the Law of the People's Republic of China on Environmental Protection and the Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution, protecting the environment, safeguarding human health, AND regulating the determination method of water-soluble anions in ambient airborne particles.

This standard specifies the ion chromatography method for the determination of eight water-soluble anions (F-, Cl-, Br-, NO₂-, NO₃-, PO₄³⁻, SO₃²⁻, SO₄²⁻) in the ambient airborne particles (TSP, PM₁₀, PM_{2.5}, dustfall, etc.).

This standard is firstly issued.

Appendix A of this standard is a normative appendix, AND Appendix B and Appendix C are informative appendixes.

This standard is formulated under the organization of the Department of Science, Technology and Standards of the Ministry of Environmental Protection.

The main drafting organizations of this standard. Gansu Provincial Environmental Monitoring Center Station.

The verification organizations of this standard. College of Chemistry and Chemical Engineering of Xiamen University, Center for Analysis and Testing of Guangzhou University, Environmental Research Center of Chinese Academy of Sciences, Jiayuguan City Environmental Monitoring Station, Environmental Monitoring Station of Hulunbeir of Inner Mongolia, Guangdong Polytechnic of Environmental Protection Engineering, Jingmen Environmental Protection Monitoring Station.

This standard was approved by the Ministry of Environmental Protection on May 13, 2016.

This standard has been implemented since August 1, 2016.

As for this standard, the Ministry of Environmental Protection is responsible for its interpretation.

Ambient air - Determination of the water soluble anions (F⁻, Cl⁻, Br⁻, NO₂⁻, NO₃⁻, PO₄³⁻, SO₃²⁻, SO₄²⁻) from atmospheric particles - Ion chromatography

Warning. The chemical reagents used in the experiment such as sodium fluoride and sodium nitrite are harmful to human health. WEAR protective equipment in accordance with the regulations, and AVOID contact with skin and clothing.

1 Scope

This standard specifies ion chromatography for the determination of water-soluble anions (F⁻, Cl⁻, Br⁻, NO₂⁻, NO₃⁻, PO₄³⁻, SO₃²⁻, SO₄²⁻) in ambient airborne particles.

This standard applies to the determination of 8 kinds of water-soluble anions

(F-, Cl-, Br-, NO₂-, NO₃-, PO₄³⁻, SO₃²⁻, SO₄²⁻) in the ambient airborne particles (TSP, PM₁₀, PM_{2.5}, dustfall, etc.).

As for the filter sample of ambient airborne particles, when the sampling volume is 60 m³ (standard state), the extract volume is 100 ml, AND the sample injection volume is 25 µl, the detection limit of this method is 0.010 µg/m³ ~

0.085 µg/m³, AND the lower detection limit is 0.040 µg/m³ ~ 0.340 µg/m³. As for the dustfall sample, when the sample injection amount is 0.100 g, the extract volume is 100 ml, AND the sample injection volume is 25 µl, the detection limit of this method is 0.006 µg/g ~ 0.051 µg/g, AND the lower detection limit is 0.024 µg/g ~ 0.204 µg/g. As for details, SEE Appendix A.

Note 1: This method is also applicable to the analysis of samples collected from particles such as dust aerosols and dust storms in special weather conditions.

2 Normative references

The following documents or the terms thereof are referenced in this standard. For undated references, the valid version of the referenced document applies to this standard.

GB/T 15265 Ambient air - Determination of dustfall - Gravimetric method

GB/T 15432 Ambient air - Determination of total suspended particulates - Gravimetric method

HJ 93 Specifications and test procedures for PM₁₀ and PM_{2.5} sampler

HJ 618 Determination of atmospheric articles PM₁₀ and PM_{2.5} in ambient air by gravimetric method

HJ/T 194 Manual methods for ambient air quality monitoring

HJ/T 374 Technical requirement and test procedures for total suspended particulates sampler

HJ/T 375 Technical requirement and test procedures for ambient air sampler

3 Terms and definitions

The following terms and definitions apply to this standard.

3.1 Ambient air atmospheric particles

It refers to the ambient air atmospheric particles collected on the filter membrane the sampling device (including TSP, PM₁₀, PM_{2.5}, etc.), OR the ambient air dustfall collected through such collection devices as dust cylinder.

3.2 Water-soluble anions

It refers to the anions of the ambient air atmospheric particles which are dissolved in deionized water without adding chemical reagent. The water-soluble anions determined by this method include F⁻, Cl⁻, Br⁻, NO₂⁻, NO₃⁻, PO₄³⁻, SO₃²⁻, SO₄²⁻.

4 Principles of the method

The ambient air atmospheric particle samples collected is, after being subjected to ultrasonic extraction by deionized water AND exchange and separation by anion chromatographic column, detected by a suppressed conductivity detector. MAKE qualitative determination based on the retention time; and MAKE quantitative determination based on peak height of peak area.

5.1 For the 2 kinds of anion with similar retention time, when the concentration of the 2 kinds of anions is greatly different that it affects the determination of the

6.17 Nitrate ion standard stock solution. rho (NO₃⁻) = 1000 mg/L.

Accurately WEIGH 1.6304 g of potassium nitrate (6.5); DISSOLVE it into appropriate amount of water; TRANSFER it into a 1000 ml volumetric flask; USE water to dilute it to the mark; MIX it uniformly. TRANSFER it into the polyethylene bottle; KEEP it sealed at below 4 °C in the dark; AND it can be preserved for 6 months. It may also purchase the commercially available certified standard materials.