

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 955-2018

Replacing HJ 480-2009

Ambient air?Determination of fluoride ?Filter sampling / fluoride ion-selective electrode method

环境空气氟化物的测定滤膜采样_氟离子选择电极法

(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" the environment, to ensure human health, to regulate the determination of fluoride in the ambient air, the development of this standard.

This standard specifies the fluoride ion selective electrode method for the determination of fluoride in the ambient air.

This standard is a method for sampling fluoride ion-selective electrode for the determination of fluoride in ambient air (HJ 480-2009) Revision.

This standard was first published in 1995. The standard drafting unit is Baotou Environmental Monitoring Station, September 27, 2009.

One revision, the revised unit is the Shenyang Environmental Monitoring Center Station. This is the second revision.

The main revisions are as follows.

- Modified the sampling flow;
- Complementing the requirements for sampling head structure and sampler performance in instruments and equipment;
- Simplified standard curve preparation process;
- Increased representation of results, quality assurance and quality control, and waste disposal;
- Added informative Appendix A.

From the date of implementation of this standard, "Determination of Fluoride Ion Selective Electrode Method for Determination of Fluoride in Ambient Air Fluoride" (HJ 480-2009) abolished.

Appendix A of this standard is an informative annex.

This standard is formulated by the Environmental Monitoring Department and the Science and Technology Standards Department.

This standard was drafted. China Environmental Monitoring Station.

This standard is verified by. Taiyuan Environmental Monitoring Center Station, Qinghai Environmental Monitoring Center Station, Yangzhou Environmental Monitoring Xinzhan, Zhanjiang Environmental Protection Monitoring Station, Yantai Environmental Monitoring Center Station and Inner Mongolia Autonomous Region Environmental Monitoring Center Station.

This standard is approved by the Ministry of Ecology and Environment on July 29, 2018.

This standard has been implemented since September 1, 2018.

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

1 Determination of ambient air fluoride filter membrane sampling/fluoride ion selective electrode method Warning. The hydrochloric acid used in the experiment is highly volatile and corrosive, and the reagent preparation process should be carried out in a fume hood; Wear protective equipment as required to avoid contact with skin and clothing.

1 Scope of application

This standard specifies the membrane sampling/fluoride ion selective electrode method for the determination of fluoride in ambient air.

This standard applies to the determination of gaseous and particulate fluoride in ambient air.

When the sampling flow rate is 50 L/min and the sampling time is 1 h, the detection limit of the method is 0.5 µg/m³, and the lower limit of determination is 2.0 µg/m³;

When the sampling flow rate is 16.7 L/min and the sampling time is 24 h, the detection limit of the method is 0.06 µg/m³, and the lower limit of determination is 0.24 µg/m³.

2 Normative references

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

HJ 194 Technical Specifications for Manual Air Quality Monitoring

3 Terms and definitions

The following terms and definitions apply to this standard.

Fluoride

Refers to gaseous fluoride in ambient air and particulate fluoride dissolved in hydrochloric acid solution [$c(\text{HCl}) = 0.25 \text{ mol/L}$ Fluorine meter).

4 Principle of the method

When the gaseous and particulate fluoride in the ambient air is impregnated with dipotassium hydrogen phosphate, the fluoride is fixed or retained.

On the filter membrane, the fluoride on the filter membrane is immersed in a hydrochloric acid solution, and then determined by a fluoride ion selective electrode method. The fluoride ion activity in the solution is determined.

The logarithm is linear with the electrode potential.

5 Interference and elimination

Metal ions such as Ca^{2+} , Mg^{2+} , Fe^{3+} , and Al^{3+} easily form complexes with fluoride ions, which negatively interfere with the results. In this Under the standard experimental conditions, the total ionic strength adjustment buffer solution was added, and the concentrations of Ca^{2+} , Mg^{2+} and Fe^{3+} did not exceed 50 mg/L.

Al^{3+} does not interfere with the assay when it does not exceed 2 mg/L.

26 Reagents and materials

Unless otherwise stated, analytically pure reagents in accordance with national standards were used for the analysis, and experimental water was newly prepared deionized water.

6.1 Hydrochloric acid. $\rho(\text{HCl}) = 1.19 \text{ g/ml}$.

6.2 Sodium hydroxide (NaOH).

6.3 Sodium citrate ($\text{Na}_3\text{C}_6\text{H}_5\text{O}_7 \cdot 2\text{H}_2\text{O}$).

6.4 Sodium chloride (NaCl).

6.5 Acetic acid. $w(\text{CH}_3\text{COOH}) \geq 99.5\%$.

6.7 Hexamethylenetetramine ($\text{C}_6\text{H}_{12}\text{N}_4$).

6.8 Potassium nitrate (KNO_3).

6.9 Titanium iron reagent ($\text{C}_6\text{H}_4\text{Na}_2\text{O}_8\text{S}_2 \cdot \text{H}_2\text{O}$).

6.10 Dipotassium hydrogen phosphate ($\text{K}_2\text{HPO}_4 \cdot 3\text{H}_2\text{O}$).

6.11 Sodium fluoride (NaF). excellent grade, dried at 110°C for 2 h, dried and cooled.

6.12 Hydrochloric acid solution. $c(\text{HCl}) = 0.25 \text{ mol/L}$.

20.8 ml of hydrochloric acid (6.1) was dissolved in a certain amount of water and diluted to 1 L with water.

6.13 Sodium hydroxide solution. $c(\text{NaOH}) = 5.0 \text{ mol/L}$.

Weigh 100.0 g of sodium hydroxide (6.2), dissolve in water, and dilute to 500 ml after cooling.

6.14 Sodium hydroxide solution. $c(\text{NaOH}) = 1.0 \text{ mol/L}$.

Measure 200 ml of sodium hydroxide (6.13) and dilute to 1 L with water.

6.15 Dipotassium hydrogen phosphate impregnating solution. $\rho(\text{K}_2\text{HPO}_4 \cdot 3\text{H}_2\text{O}) = 76.0 \text{ g/L}$.

After weighed 76.0 g of dipotassium hydrogen phosphate (6.10), it was diluted with water and diluted to 1 L.

6.16 Total ionic strength adjustment buffer solution (TISAB).

6.16.1 Total ionic strength adjustment buffer solution (TISABI). Weigh 58.0 g of sodium chloride (6.4), 10.0 g of citric acid Sodium (6.3), take 50 ml of acetic acid (6.5), add 500 ml of water to dissolve. After dissolution, add sodium hydroxide solution (6.13) 135 ml, adjust the pH of the solution to 5.2, and dilute to 1 L with water.

6.16.2 Total ionic strength adjustment buffer solution (TISABII). Weigh 142 g of hexamethylenetetramine (6.7) and 85.0 g Potassium nitrate (6.8), 9.97 g of ferrotitanium reagent (6.9), dissolved in water, adjusted to pH 5-6, diluted with water to 1 L.

6.17 Fluorine standard stock solution. $\rho(\text{F}^-) = 500 \mu\text{g/ml}$.

Accurately weigh 1.1050 g of sodium fluoride (6.11), dissolve in water, and transfer to a 1000 ml volumetric flask. Concentrate with water until Mark the line and shake it. Store in a polyethylene bottle and refrigerate at 4°C for 6 months. You can also purchase commercially available certified standards directly.

Solution.

6.18 Fluorine standard use solution. $\rho(\text{F}^-) = 10 \mu\text{g/ml}$.

Pipette 10.0 ml of fluoride standard stock solution (6.17) into a 500 ml volumetric flask, dilute to the mark with water, and shake well. Temporary Now equipped.