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

HJ 481-2009

Replacing GB/T 15433-1995

**Ambient air. Determination of the fluoride. Lime-paper sampling
followed by fluorine ion-selective electrode method**

环境空气 氟化物的测定 石灰滤纸采样氟离子选择电极法

(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 Atmospheric Pollution Human health, standardizing the monitoring methods for fluoride in the air, and developing this standard.

This standard specifies a sample of fluoride ion-selective electrode for the determination of fluoride in the ambient air.

This standard is for the determination of fluoride in ambient air, lime filter paper and fluoride ion selective electrode method (GB/T 15433-1995) Line revision.

This standard was first published in 1995. The original standard drafting unit was Baotou Environmental Monitoring Station. This is the first revision.

The main revisions are as follows.

-- modified the name of the standard;

- In the reagents and materials, the purity of the reagents used is specified, and the detailed preparation process of sodium hydroxide is added; the total ions are added.

Method for preparing intensity adjustment buffer; simplifying the preparation process of standard solution;

- specifies the operating conditions of the fluoride ion selective electrode;

-- Added electrode cleaning method to the precautions.

The national environmental protection standard "Environmental Environment" approved and issued by the former National Environmental Protection Agency on March 25, 1995, from the date of implementation of this standard.

Determination of air fluoride Lime filter paper · fluoride ion selective electrode method (GB/T 15433-1995) abolished.

This standard was formulated by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard was drafted. Shenyang Environmental Monitoring Center Station.

This standard was approved by the Ministry of Environmental Protection on September 27, 2009.

This standard has been implemented since November 1, 2009.

This standard is explained by the Ministry of Environmental Protection.

Determination of ambient air fluoride Lime filter paper sampling fluoride ion selective electrode method

1 Scope of application

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

This standard applies to the determination of the long-term average pollution level of fluoride in ambient air.

When the sampling time is one month, the lower limit of the method is $0.18 \mu\text{g}/(\text{dm}^2 \cdot \text{d})$.

2 Normative references

The contents of this standard refer to the terms in the following documents. For undated references, the latest valid version applies to this standard.

quasi.

GB 7484 Determination of fluoride in water quality - Ion selective electrode method

3 Principle of the method

Fluoride (hydrogen fluoride, silicon tetrafluoride, etc.) in the air is reacted with calcium hydroxide immersed in the filter paper to be fixed. Total ionic strength After adjusting the buffer leaching, the content of fluoride on the lime filter paper was determined by a fluoride ion selective electrode method. The measurement results reflect the placement the average level of fluoride in the air during the period.

4 Reagents and materials

The reagents used in this standard are analyzed using analytical reagents in accordance with national standards, unless otherwise stated.

Deionized water or distilled water.

4.1

Perchloric acid. 72%, excellent grade pure.

4.2

Sodium hydroxide solution $c(\text{NaOH}) = 2.5 \text{ mol/L}$. Weigh 100.0 g of pure grade sodium hydroxide, dissolved in water, and then diluted to 1 000 ml after cooling.

4.3

Sodium hydroxide solution $c(\text{NaOH}) = 5.0 \text{ mol/L}$. Weigh 100.0 g of excellent grade pure sodium hydroxide, dissolved in water, and then diluted to 500 ml after cooling.

4.4

Preparation of lime suspension. Weigh 56 g of calcium oxide, add 250 ml of water, slowly add perchloric acid (4.1) 250 ml with stirring, add Heat to produce white smoke. After cooling, add 200 ml of water and heat to evaporate until white fumes are produced. Repeat three times. If there is sediment, use glass sand core to leak.

Bucket (G3) filtration. To the resulting transparent filtrate, a sodium hydroxide solution (4.2) of 1 000 ml was added under stirring to obtain a calcium hydroxide suspension. Static After settling, the supernatant is decanted, and washed repeatedly 5 to 6 times with water. Finally, water is added to 5 000 ml, the mass fraction is about 1%, and it is kept in a sealed state.

Shake well when using.

4.5 Total ionic strength adjustment buffer solution (TISAB)

4.5.1

Total ionic strength adjustment buffer solution (TISABI). Weigh 58.0 g of sodium chloride, 10.0 g of sodium citrate, and measure 50 ml of glacial acetic acid.

Add 500 ml of water. After dissolving, add 135 ml of sodium hydroxide solution (4.3), adjust the pH of the solution to 5.2, and bring up to 1 000 ml with water.

Shake well.

4.5.2

Total ionic strength adjustment buffer solution (TISABII). weigh 142 g hexamethylenetetramine ((CH₂)₆N₄), 85 g potassium nitrate (KNO₃) and 9.97 g of ferrotitanium reagent (C₆H₄Na₂O₈S₂·H₂O), add appropriate amount of water to dissolve, adjust the pH to 5-6, transfer to a 1 000 ml volumetric flask, Dilute to the mark with water and shake well.

The preparation of the solution is not limited thereto, and the preparation method of the total ionic strength adjusting buffer solution in GB 7484 can also be referred to.

Note: When the sample composition is complex, acid (pH ~ 2) or alkaline (pH ~ 12), TISABII formula can be used.

4.6 Sodium fluoride standard stock solution rho (NaF)=1 000 µg/ml. Weigh 0.221 0 g sodium fluoride (excellent grade, dry at 110 °C for 2 h) Cool to room temperature in a desiccator, dissolve in water, and transfer to a 100 ml volumetric flask. Make up to the mark with water and shake well. Stored in a polyethylene bottle, Save in the refrigerator. Take it out when it is ready and put it at room temperature for later use.

4.7 Sodium Fluoride Standard Solution. Dilute sodium fluoride standard stock solution (4.6) with water to 2.5, 5.0, 10.0, 25.0, 50.0, 100.0 µg/ml the standard solution is ready for use. The above reagent solutions should be stored in polyethylene plastic bottles.

4.8 Qualitative filter paper. 12.5 cm in diameter.

4.9 Lime filter paper. Put a small amount of lime suspension with two large petri dishes (about 15 cm in diameter) and make a 12.5 cm diameter qualitative filter paper (4.8) Into the first dish, soaked, drained, and then soaked in a second dish, drained (immersed 5 to 6 sheets of filter paper, replaced with new stone Gray suspension), then spread on a large piece of clean, fluorine-free qualitative filter paper, dried at 60 ~ 70 ° C, into a plastic box (bag), sealed Put it in the desiccator (no desiccant in the dryer).