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HJ

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

HJ 673-2013

Replacing GB/T 14673-1993

**Water quality. Determination of vanadium by graphite furnace
atomic absorption spectrometric method**

水质 钒的测定 石墨炉原子吸收分光光度法

(English Translation)

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Foreword

To protect the environment and protect the human body 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 Water Pollution Prevention and Control Health, standardization of vanadium monitoring methods in water, revision of this standard.

This standard specifies the graphite furnace atomic absorption spectrophotometry for the determination of vanadium in water and wastewater.

This standard applies to the determination of vanadium in surface water, groundwater, domestic sewage and industrial wastewater.

This standard is a revision of the "Glass furnace atomic absorption spectrophotometry" (GB/T 14673-1993). This standard First published in 1993. The original standard was

drafted by. Shanghai Environmental Monitoring Center. This is the first revision.

The main revisions are as follows.

- Added common elements and concentration-related content of anti-interference in this standard method;
- Modified the detection limit and lower limit of determination of vanadium;
- Rewritten the original standard Chinese character expression and standard format.

From the date of implementation of this standard, "Determination of water quality vanadium by graphite furnace atomic absorption spectrophotometry" (GB/T 14673-1993) is abolished.

This standard is revised and revised by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. National Environmental Analysis and Testing Center.

The units that participate in the verification of this standard are. National Environmental Analysis and Testing Center, Beijing Physical and Chemical Testing Center, and Heilongjiang Environmental Monitoring Center.

Harbin Environmental Monitoring Center, Guangxi Environmental Monitoring Center, Yinchuan Environmental Monitoring Center.

This standard was approved by the Ministry of Environmental Protection on November 21, 2013.

This standard has been implemented since February 1, 2014.

This standard is explained by the Ministry of Environmental Protection.

Water quality - Determination of vanadium - Graphite furnace atomic absorption spectrophotometric method

1 Scope of application

This standard specifies the graphite furnace atomic absorption spectrophotometry for the determination of vanadium in water and wastewater.

This standard applies to the determination of vanadium in surface water, groundwater, domestic sewage and industrial wastewater.

The detection limit of this method is 0.003 mg/L, the lower limit of determination is 0.012 mg/L, and the upper limit of determination is 0.200 mg/L.

2 Principle of the method

After proper processing, the sample is injected into a graphite furnace atomizer. The vanadium ions contained in the sample are atomized in the graphite tube, which is high.

The temperature is separated into atomic vapor. The ground state atom of the element to be tested absorbs the resonance line energy from the vanadium hollow cathode lamp.

Its absorbance is proportional to its concentration within a certain range.

3 Interference and elimination

The common coexisting components in surface water and groundwater do not interfere with the determination of vanadium.

Coexisting ions and compounds in industrial wastewater do not interfere with the determination at common concentrations. When the wastewater contains 0.040 mg/L Vanadium, 10,000 mg/L Cl, 300 mg/L Fe, 100 mg/L Co, Zn, Mn, K, Na, Ca, Mg, Sb, Bi, Pb, 10.0 mg/L of Ni, Cu, Cr, Cd, As, Ag had no effect on the measurement results.

4 Reagents and materials

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

The water is freshly prepared deionized or distilled water.

4.1

Nitric acid (HNO₃). $\rho = 1.42$ g/mL, excellent grade pure.

4.2

Ammonium metavanadate (NH₄VO₃). spectrally pure.

4.3

Nitric acid solution. 1 1. Formulated with nitric acid (4.1).

4.4

Nitric acid solution. 0.2 99.8. Formulated with nitric acid (4.1).

4.5

Standard stock solution of vanadium. $\rho = 1000$ mg/L.

Weigh 2.960g (am. accurate to 0.0001g) of ammonium metavanadate (4.2), dissolve with 5mL nitric acid (4.1), and heat if necessary.

Until completely dissolved, dilute to 1000 mL with water. Or purchase certified standard

samples.

4.6

Standard use solution of vanadium. $\rho=0.200$ mg/L.

Prepare by diluting the vanadium standard stock solution (4.5) with a nitric acid solution (4.4).

4.7

Argon, purity not less than 99.99%.

5 Instruments and equipment

Unless otherwise stated, the analysis used a Class A glass gauge in accordance with national standards.

5.1

Graphite furnace atomic absorption spectrophotometer with background correction function.

5.2

Pyrolytic coated graphite tube.

5.3

Vanadium hollow cathode lamp.

5.4

Common instruments and common glassware in general laboratories.

6.1 Sample collection and preservation

Samples were taken in polyethylene plastic bottles. Wash the polyethylene plastic bottle 3 times before sampling. Sample collection when determining the total amount of vanadium Immediately after the addition of nitric acid (4.3), the pH was adjusted to 7 Analysis steps

7.1 Commissioning of the instrument

The measurement parameters can be selected according to the instrument's instruction manual. Table 1, Table 2 lists the instrument reference measurement parameters.

Table 1 Instrument reference measurement conditions

Element wavelength (nm) lamp current (mA) slit (nm) V 318.4 12.5 1.3

Table 2 Reference temperature program

Heating stage temperature (°C) time (s) Dry 80~140 20 Ashing 900 20 Atomization 2700 6