

CCS Z 16

HJ

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

HJ 700-2014

**Water quality. Determination of 65 elements. Inductively
coupled plasma-mass spectrometry**

水质 65种元素的测定 电感耦合等离子体质谱法

(English Translation)

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Foreword

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, to protect

the environment, this standard is formulated to ensure human health and standardize the monitoring methods for 65 elements in water.

This standard specifies inductively coupled plasma mass spectrometry for the determination of 65 elements in water.

This standard is the first release.

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

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

This standard is mainly drafted by. Jiangsu Environmental Monitoring Center and Suzhou Environmental Monitoring Center Station.

The units that participate in the verification of this standard are. Nanjing Environmental Monitoring Center Station, Wuxi Environmental Monitoring Center Station, Shaoxing City Ring Environmental Monitoring Center Station, Ningbo Environmental Monitoring Center, Suzhou Water Supply Company Water Quality Testing Center, Maanshan Environmental Monitoring Heart station.

This standard was approved by the Ministry of Environmental Protection on May 16, 2014.

This standard has been implemented since July 1, 2014.

This standard is explained by the Ministry of Environmental Protection.

Water quality - Determination of 65 elements - Inductively coupled plasma mass spectrometry WARNING - Avoid direct contact with the skin when preparing and measuring standard solutions for highly toxic carcinogens such as barium, arsenic, and cadmium. Hydrochloric acid, nitric acid They are all highly chemically corrosive and irritating. They should be worn with protective equipment according to the requirements and operated in a fume hood to avoid acid mist absorption.

Into the respiratory tract and contact with skin and clothing.

1 Scope of application

This standard specifies inductively coupled plasma mass spectrometry for the determination of 65 elements in water.

This standard applies to surface water, groundwater, domestic sewage, low concentration industrial wastewater, silver, aluminum, arsenic, gold, boron, antimony, , , calcium, cadmium, strontium, cobalt, chromium, bismuth, copper, bismuth, antimony, bismuth, iron, gallium, antimony, bismuth, antimony, bismuth, indium, antimony, Potassium, strontium, lithium, strontium, magnesium, manganese, molybdenum, sodium, strontium,, nickel,

phosphorus, lead, palladium, iridium, platinum, rhodium, iridium, osmium, iridium, Determination of antimony, bismuth, selenium, tellurium, tin, antimony, bismuth, antimony, bismuth, titanium, antimony, bismuth, uranium, vanadium, tungsten, antimony, bismuth, zinc and zirconium.

The detection limit of each element of the method is 0.02 µg/L to 19.6 µg/L, and the lower limit of determination is 0.08 µg/L to 78.4 µg/L. each See Appendix A for the method detection limits for the elements.

2 Normative references

The contents of this standard refer to the following documents or their terms. For undated references, the valid version is appropriate.

Used in this standard.

GB/T 6682 Analytical laboratory water specifications and test methods HJ/T 91 Surface Water and Wastewater Monitoring Technical Specifications HJ/T 164 Technical Specifications for Groundwater Environmental Monitoring HJ 493 Technical Regulations for Preservation and Management of Water Quality Samples HJ 677 Water quality metal total digestion nitric acid digestion method HJ 678 Water quality metal total digestion microwave digestion method

3 Terms and definitions

The following terms and definitions apply to this standard.

3.1 Soluble elements

Refers to the element content measured after filtration through a 0.45 µm filter on a sample that has not been acidified.

3.2 Total amount of elements

Refers to the unmeasured sample, the element content measured after digestion.

4 Principle of the method

After pretreatment, the water sample is detected by inductively coupled plasma mass spectrometry according to the mass spectrum or characteristic ion of the element.

Qualitative, internal standard method quantitative. The sample is carried into the atomization system by the carrier gas for atomization, and then enters the plasma as an aerosol.

The axial channel is fully vaporized, dissociated, atomized and ionized in high temperature

and inert gas, and converted into charged positive the ions enter the mass spectrometer through the ion collection system, and the mass spectrometer separates and determines according to the mass-to-charge ratio of the ions, that is, the mass of the elements.

Sexual and quantitative analysis. Within a certain concentration range, the signal response value corresponding to the element mass number is proportional to its concentration.

5.1 Mass Spectral Interference

Mass spectrometry interference mainly includes polyatomic ion interference, isobaric interference, oxide and double charge interference. Multiple original Sub-ion interference is the most important source of interference for ICP-MS, and can be used for interference correction equations, instrument optimization, and collision reactions.

Pool technology to solve, common polyatomic ion interference see Appendix Table B.1. Isobaric interference can use interference correction the equation is corrected, or the sample is chemically separated before analysis, and the main interference correction equation is attached.

Record B.2. Oxide interference and double charge interference can reduce the effects by adjusting instrument parameters.

5.2 Non-mass speculative interference

Non-mass spectroscopic interference mainly includes matrix suppression interference, space charge effect interference, physical effect interference and the like. Non-mass type the degree of interference is related to the nature of the sample matrix and can be eliminated by internal standard method, instrument condition optimization or standard addition method.

6 Reagents and materials

Reagents used in this standard are analyzed using high-grade purification reagents that meet national standards, unless otherwise stated.

6.1

Experimental water. resistivity $\geq 18 \text{ Mohm} \cdot \text{cm}$, and other indicators meet the first-class standard in GB/T 6682.

6.2

Nitric acid. $\rho(\text{HNO}_3) = 1.42 \text{ g/mL}$, superior grade or superior grade pure, if necessary, purified.