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

GB/T 5121.11-2008

Replacing GB/T 5121.11-1996; GB/T 13293.10-1991

**Methods for chemical analysis of copper and copper alloys --
Part 11: Determination of zinc content**

铜及铜合金化学分析方法 第11部分：锌含量的测定

(English Translation)

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Foreword

GB/T 5121 "Copper and copper alloy chemical analysis method" a total of 27 sections.

- Part 1. Determination of copper content;
- Part 2. Determination of phosphorus content;
- Part 3. Determination of lead content;
- Part 4. Carbon, Determination of sulfur content;
- Part 5. Determination of nickel content;
- Part 6. Determination of bismuth content;
- Part 7. Determination of arsenic content;
- Part 8. Determination of oxygen content;
- Part 9. Determination of iron content;
- Part 10. Determination of tin content;
- Part 11. Determination of zinc content;
- Part 12. Determination of antimony content;
- Part 13. Determination of aluminum content;
- Part 14. Determination of manganese content;
- Part 15. Determination of cobalt content;
- Part 16. Determination of chromium content;
- Part 17. Determination of beryllium content;
- Part 18. Determination of magnesium content;
- Part 19. Determination of silver content;

- Part 20. Determination of zirconium content;
- Part 21. Determination of titanium content;
- Part 22. Determination of cadmium content;
- Part 23. Determination of silicon content;
- Part 24. selenium, tellurium content was measured;
- Part 25. Determination of boron content;
- Part 26. Determination of mercury content;
- Part 27. Inductively coupled plasma atomic emission spectrometry.

This is Part 11.

This section includes a method, Method II.

The method uses a modification of this section ISO 4740. 1985 "Determination of copper and copper alloys --- zinc content by flame atomic absorption spectrometry" on the main technical content of ISO 4740. 1985 the same structure does not correspond exactly to the preparation of the specific technical differences, see Appendix A, Appendix B.

This Part replaces GB/T 5121.11-1996 "Copper and copper alloys - Determination of zinc content", GB/T 13293.10-1991 "Methods for chemical analysis of high purity copper cathode flame atomic absorption spectrometric method for the determination of zinc content." this portion of the GB/T 5121.11-1996, GB/T 13293.10-1991 compared to the main changes are as follows.

--- One method of GB/T 5121.11-1996 "on the first chapter 1 flame atomic absorption spectrometry" and GB/T 13293.10-1991 merger revised analysis extends from the lower limit of 0.001 to 0.00005 percent, supplemented with quality assurance and control provisions, increasing the precision of the terms;

--- Second method is GB/T 5121.11-1996 in "Method 2 The second 4-methyl - pentanone -2 extraction separation -Na₂EDTA Amendment titration ", complementing the quality assurance and control provisions, increasing the precision of the terms.

This section in Appendix A, Appendix B is an informative annex.

This part is proposed by the China Nonferrous Metals Industry Association.

The non-ferrous metal part by the National Standardization Technical Committee.

This section Chinalco Luoyang Copper Co., Ltd., Beijing General Research Institute of Mining and Metallurgy, China Nonferrous Metals Industry is responsible Institute of Standards Metrology and Quality Drafted.

A part of this method, Method II was drafted by the Beijing Nonferrous Metal Research

Institute.

The method of the present section a northwest Gansu Baiyin Copper limited liability company, Chinalco Luoyang Copper Co., Ltd. participated in the drafting.

1.1 Scope

This method specifies the method for determination of copper and copper alloy zinc content.

This method is applicable to the determination of copper and copper alloy of zinc content measurement range. 0.00005% to 2.00%.

1.2 Principle of the method

Sample plus hydrofluoric acid with nitric acid or nitric acid, or hydrochloric acid plus hydrogen peroxide dissolved, using air - acetylene flame atomic absorption spectrometer wave Duration 213.8nm measured absorbance of zinc, zinc content is not more than 0.0020% of the sample is dissolved in nitric acid, copper conduct electricity after the lifting of Determination.

1.3 Reagents

Unless otherwise indicated in the analysis using only recognized as analytical grade reagents and distilled or deionized water or equivalent purity.

1.3.1

Copper (Cu mass fraction $\geq 99.99\%$, zinc mass fraction is less than 0.0001%).

1.3.2

hydrofluoric acid ($\rho 1.15\text{g/mL}$).

1.3.3

Hydrogen peroxide ($\rho 1.11\text{g/mL}$).

1.3.4

Hydrogen peroxide (1 + 9).

1.3.5

hydrochloric acid (1 + 1).

1.3.6

hydrochloric acid (1 + 120).

1.3.7

nitric acid (1 + 1).

1.3.8

boric acid solution (40g/L).

1.3.9

copper solution (20g/L). Weigh 10.0g copper (1.3.1) was placed in a beaker of 500mL, 70mL of nitric acid was added (1.3.7). plus Heat to dissolve completely removing nitrogen oxides boiled, cooled, transferred to 500mL volumetric flask. Dilute with water to volume, and mix.

1.3.10

standard zinc stock solution. Weigh 0.5000g pure zinc (Zn mass fraction $\geq 99.95\%$), placed in 250mL beaker, add 10mL of nitric acid (1.3.7) and heated to dissolve completely, boiled to remove nitrogen oxides, after cooling transferred 1000mL volumetric flask, diluted with water to the mark, and mix. This solution 1mL containing 500 μ g zinc.

1.3.11

Zinc Standard Solution A. Pipette 20.00mL standard zinc stock solution (1.3.10) was placed in 500mL volumetric flask, was added 10mL Nitric acid (1.3.7), dilute to the mark and mix. This solution 1mL containing 20 μ g zinc.

1.3.12

Zinc standard solution B. Pipette 5.00mL standard zinc stock solution (1.3.10) was placed in 500mL volumetric flask, add 10mL nitrate Acid (1.3.7), dilute to the mark and mix. This solution 1mL containing 5 μ g zinc.

1.4 Instrument

1.4.1

atomic absorption spectrometer attached zinc hollow cathode lamp.

Under optimum working conditions for those who can reach the following indicators can be used.

--- Sensitivity. the measurement sample solution matrix consistent solution, characterized in zinc concentration should not exceed 0.01mg/mL.

--- Precision. standard solution with the highest concentration of 10 times the absorbance measurements, the standard deviation should not exceed the average absorbance of 1.0%;

With the lowest concentration of the standard solution (not "zero" standard solution) measuring the absorbance of 10 times, the standard deviation should not exceed the maximum concentration