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

GB/T 5121.12-2008

Replacing GB/T 5121.12-1996; GB/T 13293.4-1991

**Methods for chemical analysis of copper and copper alloys --
Part 12: Determination of antimony content**

铜及铜合金化学分析方法 第12部分：锑含量的测定

(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 12.

This section includes a method, second method, Method three. Antimony content at 0.0010% to 0.070% recommended party arbitration Act II.

This section Method Three identical with ISO 5956. 1986 "copper alloys --- --- Determination of antimony content - Rhodamine B photometric," with international standards Compared quasi made the following editorial changes.

- With a decimal point instead of a comma as the decimal point in the international standard " , . , " ;
- Use the "method" instead of "this International Standard";
- Revised international standard-Africa legal units of measurement;
- The formula, reg number, table number to re-annotate;
- Remove the cover of the international standards, directory, foreword and introduction.

This Part replaces GB/T 5121.12-1996 "Copper and copper alloys - Determination of antimony content" and GB/T 13293.4-1991 "spectrophotometric determination of antimony content purity copper cathode method 5-Br-PADAP spectrophotometry." this portion of the GB/T 5121.12-1996, GB/T 13293.4-1991 compared to the main changes are as follows.

- One method of GB/T 13293.4-1991 the revision. The use of "Hydride Generation - Atomic Fluorescence Spectrometry" instead of the original standard "5-Br-PADAP spectrophotometry." Measured by the scope of 0.00005% to 0.00005% from 0.001% ~ ~ 0.0020%;
- Second method is GB/T 5121.12-1996 amendments, supplements the provisions of quality assurance and control, increasing the precision of the terms;
- Adds three. the equivalent international standard ISO 5956. 1986 "Determination of antimony content copper alloys --- --- Rhodamine B light Law degree. " 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 method in this section by the JCC Guixi Smelter, Beijing General Research Institute of Mining and Metallurgy drafted.

This method a part in drafting the Tongling Nonferrous Metals Group Holdings.

1.1 Scope

This method specifies the method for determination of copper and copper alloys antimony content.

This method is applicable to the determination of copper and copper alloy of antimony content in measuring range. 0.00005% to 0.0020%.

1.2 Principle of the method

The sample is dissolved in nitric acid, with ammonia in the medium lanthanum hydroxide co-precipitation of antimony and copper and the substrate separation, precipitation heat dissolved in hydrochloric acid. In the hydrogenation Substance generator, is reduced antimony potassium borohydride as hydride with argon gas into the quartz furnace atomizer, the determination of antimony on the atomic fluorescence spectrometer the fluorescence intensity of the element.

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

nitric acid (1 + 1) pure class distinctions.

1.3.2

hydrochloric acid (rho1.19g/mL) pure class distinctions.

1.3.3

hydrochloric acid (11 + 89).

1.3.4

ammonia (rho0.90g/mL) BVIII level.

1.3.5

ammonia (5 + 95).

1.3.6

thiourea - ascorbic acid solution. Weigh 100g thiourea, 50g of ascorbic acid, dissolved in water and diluted to 1000mL, shake.

1.3.7

lanthanum nitrate (50g/L). Weigh 50g of lanthanum nitrate dissolved in water 1000mL, shake.

1.3.8

solution of potassium borohydride (15g/L). Weigh 15g of potassium borohydride dissolved containing potassium hydroxide (5g/L) aqueous solution of 1000mL, shake uniform. Using now.

1.3.9

Antimony standard stock solution. Weigh 0.1000g metal antimony (Sb mass fraction $\geq 99.95\%$), low-temperature heating nitric acid dissolved in 10mL (1.3.1), add tartaric acid 0.5g, was added 90mL of nitric acid (1.3.1), cooled and transferred to 1000mL volumetric flask, dilute to the mark with water, Shake well. This solution 1mL containing 100 μ g antimony.

1.3.10

Antimony standard solution. Pipette 2.00mL antimony standard stock solution (1.3.9) in 200mL flask, add hydrochloric acid (1.3.2) 20mL, diluted with water to the mark. This solution 1mL containing 1 μ g antimony.

1.4 Instrument

1.4.1

atomic fluorescence spectrometer, with high-intensity hollow cathode lamp antimony.

1.4.2

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

--- Detection limit. not more than 2×10^{-9} g/mL.

--- Precision. antimony standard solution measuring 10 times the fluorescence intensity 0.02 μ g/mL, the standard deviation should not exceed the average fluorescence intensity 5.0% degrees.

--- AFS230 atomic fluorescence spectrometer work (recommended) condition.