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

YS/T 990.18-2014

Methods for chemical analysis of copper matte. Part 18: Determination of lead, zinc, nickel, arsenic, bismuth, antimony, calcium, magnesium, cadmium and cobalt content. Inductively coupled plasma atomic emission spectrometry

冰铜化学分析方法 第18部分：铅、锌、镍、砷、铋、锑、钙、镁、镉、钴量的测定
电感耦合等离子体原子发射光谱法

(English Translation)

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Foreword

YS/T 990 "Methods for chemical analysis of copper matte" is divided into 18 parts.

- Part 1. Determination of copper content iodometry;
- Part 2. Determination of gold and silver atomic absorption spectroscopy and fire assay;
- Part 3. Determination of sulfur content - Gravimetric method and combustion titration method;
- Part 4. Determination of the amount of bismuth atomic absorption spectrometry;
- Part 5. Determination of the amount of fluorine ion selective electrode method;
- Part 6. Determination of lead content - Atomic absorption spectrometry and Na₂EDTA titration;
- Part 7. Determination of cadmium content - Atomic absorption spectrometry;
- Part 8. Determination of arsenic content by hydride generation - atomic fluorescence spectrometry, diethyl dithiocarbamate spectrophotometry silver and potassium bromate titration;
- Part 9. Determination of iron content dichromate method;
- Part 10. Determination of silicon dioxide content molybdenum blue spectrophotometric method and silicon potassium fluoride titration;
- Part 11. Determination of the amount of nickel atom absorption spectrometry;
- Part 12. Determination of the amount of chromium oxide of aluminum Azure S Spectrophotometry;
- Part 13. Determination of magnesium oxide content - Atomic absorption spectrometry;
- Part 14. Determination of the amount of zinc atomic absorption spectrometry and Na₂EDTA titration;
- Part 15. Determination of antimony content - Atomic absorption spectrometry;

--- Part 16. Determination of mercury content - Cold atomic absorption spectrometry;

--- Part 17. Determination of the amount of cobalt atomic absorption spectrometry;

--- Part 18. lead, zinc, nickel, arsenic, bismuth, antimony, calcium, magnesium, cadmium, cobalt content - Inductively coupled plasma atomic emission spectrometry.

This section YS/T Part 18 990.

This section drafted in accordance with GB/T 1.1-2009 given rules.

The non-ferrous metal part by the National Standardization Technical Committee (SAC/TC243) centralized.

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1 Scope

This section YS/T 990 provides for lead, zinc, nickel, arsenic, bismuth, antimony, calcium, magnesium, cadmium, cobalt content determination of copper matte.

This section applies to the determination of copper in ice lead, zinc, nickel, arsenic, bismuth, antimony, calcium, magnesium, cadmium, cobalt content. Determination of the range in Table 1.

Table 1 Determination of the range of elements

Element	As	Bi	Ca	Cd	Co	Mg	Ni	Pb	Sb	Zn	Measuring range /%
	0.010 ~ 1.00	0.050 ~ 0.50	0.50 ~ 2.00	0.010 ~ 0.50	0.010 ~ 0.50	0.050 ~ 4.00	0.010 ~ 1.00	0.10 ~ 5.00	0.010 ~ 1.00	0.20 ~ 2.00	

2 Method summary

Sample with nitric acid, hydrochloric acid, hydrofluoric acid, perchloric acid dissolved in dilute aqua regia medium, using inductively coupled plasma atomic emission spectrometry, A selected wavelength in the spectrometer, measure the emission intensity of each element measured. According to the standard curve method to calculate the content of each element.

3 Reagents

Unless otherwise indicated, used in the analysis confirmed only for the gifted class pure reagents; the water is a water.

3.1

hydrochloric acid ($\rho = 1.19\text{g/mL}$).

3.2

hydrochloride (12).

3.3

nitric acid ($\rho = 1.42\text{g/mL}$).

3.4

nitric acid (11).

3.5

nitric acid (13).

Mixed acid 3.6. 1 volume of hydrochloric acid 3 vol nitric acid.

3.7

mixed acid (11).

3.8

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

3.9

perchloric acid ($\rho = 1.67\text{g/mL}$).

3.10

lead standard stock solution. Weigh 1.0000g metallic lead ($w_{\text{Pb}} \geq 99.99\%$), placed in 300mL beaker, add 60mL of nitric acid (3.5), low dissolved by heating, cooling, transferred to 1000mL volumetric flask, dilute with water to volume, and mix. This solution containing 1mL 1mg lead.

3.11

standard zinc stock solution. Weigh 1.0000g zinc metal ($w_{\text{Zn}} \geq 99.99\%$) placed in 300mL beaker, add 20mL of nitric acid (3.4), low-temperature dissolution, heated to remove nitrogen oxides and remove cooling. Transferred 1000mL volumetric flask, was added 40mL of nitric acid (3.3), with Dilute with water to volume, and mix. 1mL solution containing 1mg zinc.