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

YS/T 990.12-2014

**Methods of chemical analysis of copper matte.Part 12:
Determination of aluminum oxide content.Spectrophotometry
of chromazurol S**

冰铜化学分析方法 第12部分：三氧化二铝量的测定 铬天青S分光光度法
(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 12 990.

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) and focal points.

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1 Scope

This section YS/T 990 specifies the method for determination of copper matte aluminum oxide content.

This section applies to the determination of ice copper aluminum oxide content. Measurement range of 0.20% to 1.00%.

2 Method summary

Sample sodium hydroxide, sodium peroxide melt, flooding, sedimentation separation to remove titanium, silver, copper, manganese and a lot of, respectively, with thiourea, ascorbic Ascorbic acid masking remnants of copper, iron, vanadium eliminate interference with hydroxylamine hydrochloride in pH5.6 ~ 6.2 acetic acid - ammonium acetate buffer solution, aluminum and chromium Azure S- octyl polyethylene glycol phenyl ether (emulsifier OP) forming a ternary complex, in the spectrophotometer at 650nm wavelength measured absorbance Degrees, aluminum oxide content is calculated using the standard curve method. In a sample should not or low content of fluorine does not affect the color of aluminum.

3 Reagents

Unless otherwise specified, the reagents were analytical reagent solution preparation and analysis of water are secondary deionized water or equivalent purity of water.

3.1

sodium hydroxide.

3.2

sodium peroxide.

3.3

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

3.4

hydrochloride (2mol/L).

3.5

hydrochloric acid (0.6mol/L).

3.6

hydrochloric acid (0.1mol/L).

3.7

Sodium hydroxide solution (200g/L).

3.8

Ammonia (2mol/L).

3.9

aqueous ammonia (0.1mol/L).

3.10

Thiourea (30g/L).

3.11

ascorbic acid solution (20g/L). Using now.

3.12

hydroxylammonium hydrochloride solution (100g/L). Using now.

3.13

Chromium Azure S solution. Weigh 0.2g Chromium Azure dissolved in 100mL anhydrous ethanol, diluted with water to 200mL, and mix.

3.14

Polyethylene glycol octylphenyl ether (emulsifier OP) solution (1499).

3.15

acetic acid - ammonium acetate buffer solution. A 485mL Ammonium acetate (4mol/L) and 15mL acetic acid (4mol/L) mixed (in preparation 4mol/L ammonium acetate solution should be adjusted to pH 7).

3.16

thymol blue solution (1g/L). Weigh 0.1g of thymol blue was dissolved in 50mL of absolute ethanol, diluted with water to 100mL, Mix well.

3.17

aluminum standard stock solution. Weigh 0.1000g of aluminum ($w_{Al} \geq 99.99\%$) in 200mL beaker, add 50mL hydrochloric acid