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

YS/T 716.6-2009

**Methods for chemical analysis of low grade blister. Part 6:
Determination of arsenic, bismuth, nickel, lead, antimony, tin and zinc
contents. Inductively coupled plasma-atomic emission spectrometry**

黑铜化学分析方法 第6部分：砷、铋、镍、铅、锑、锡、锌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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Table of Contents

- Foreword
- 1 Scope
- 2 Method summary
- 3 Reagents

Foreword

YS/T 716-2009 "chemical analysis of black copper" is divided into six parts.

- Part 1. Determination of copper content of sodium thiosulfate titration;
- Part 2. Determination of the amount of gold and silver fire assay;
- Part 3. Flame atomic bismuth, nickel, lead, antimony and zinc content absorption spectrometry;
- Part 4. Determination of arsenic content iodometry;
- Part 5. Determination of tin content potassium iodate titration;
- Part 6. arsenic, bismuth, nickel, lead, antimony, tin, zinc content - Inductively coupled plasma atomic emission spectrometry.

This section YS/T Part 6 716.

This section does not arbitration as a method.

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

This section is responsible for drafting unit. Tongling Nonferrous Metals Group Holdings Limited.

Participated in the drafting of this section. Beijing Nonferrous Metal Research Institute, Chinalco Luoyang Copper Co., Ltd.

1 Scope

YS/T of the provisions of section 716 of the black copper arsenic, bismuth, nickel, lead, antimony, tin, determination of zinc content.

This section applies to black copper (80.00% - 95.00%) of arsenic, bismuth, nickel, lead, antimony, tin, zinc measurement, range in Table 1.

Table 1 Measuring range

Element	As	Bi	Ni	Pb	Sb	Sn	Zn	Content /%
	0.35 to 2.00	0.08 to 0.30	0.20 to 0.45	0.20 to 0.50	0.40 to 0.80	0.20 to 0.50	0.20 to 2.00	

2 Method summary

Sample was dissolved in aqua regia, in dilute aqua regia medium, using inductively coupled plasma emission spectrometer to measure the black copper arsenic, bismuth, nickel, lead, Antimony, tin, zinc content.

3 Reagents

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

3.1

hydrochloride (rho1.19g/mL).

Nitrate 3.2 (rho1.42g/mL).

3.3

nitric acid (1 + 1).

3.4

mixed acid. hydrochloric acid, nitric acid + water + (3 + 1 + 4).

3.5

copper (mass fraction of not less than 99.999%).

3.6

copper substrate solution. Weigh 5.00g copper substrate (3.5), was added 20mL of nitric acid (3.3), dissolve completely after the shift in the 100mL flask Diluted with water to volume, and mix. 1mL solution containing 0.05g of copper.

3.7

arsenic standard solution. Weigh 0.3300g trioxide (mass fraction of not less than 99.9%) in the 200mL beaker, add 5mL Sodium hydroxide solution (200g/L), and dissolved by stirring, adding 20mL water, 2 drops of phenolphthalein ethanol solution (1g/L) nitric acid (3.3) and Red to just disappear, and then excess 2mL; moved with nitric acid (1 + 9) 500mL volumetric flask and dilute to volume, and mix. This solution 1mL Arsenic 0.5mg.

3.8

Bismuth standard solution. Weigh 0.2000g pure bismuth (mass fraction of not less than 99.99%) in the 200mL beaker, add 30mL of nitric acid (3.3), cover sheet pan, heated until

completely dissolved and boiled to remove nitrogen oxides, are transferred to 1000mL volumetric flask, with nitric acid (1 + 9) Dilute to volume, and mix. This solution 1mL containing bismuth 0.2mg.

3.9

Nickel standard solution. Weigh 0.5000g pure nickel (mass fraction of not less than 99.99%), in the 200mL beaker, add 10mL nitrate Acid (3.3), cover sheet pan, over low heat until completely dissolved, remove the cooled shifted 1000mL volumetric flask, dilute with water to volume, and mix.

This nickel-containing solution 1mL 0.5mg.

3.10

Lead standard solution. Weigh 1.0000g pure lead (mass fraction of not less than 99.99%) in the 200mL beaker, add 20mL nitrate Acid (3.3), was dissolved and transferred to 500mL volumetric flask and dilute to volume, and mix. This solution 1mL lead 2.0mg.

3.11

Antimony standard solution. Weigh 0.5000g pure antimony (mass fraction of not less than 99.99%) in the 200mL beaker, add 20mL king