

ICS 77.120.60
CCS H 13

YS

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

YS/T 1046.2-2015

**Methods for chemical analysis of copper slag concentrates -
Part 2: Determination of gold and silver contents - Atomic
absorption spectrometry and fire assay method**

铜渣精矿化学分析方法 第2部分：金量和银量的测定 原子吸收光谱法和火试金重量法

(English Translation)

Issued on: April 30, 2015

Implemented on: October 1, 2015

Issued by: Ministry of Industry and Information Technology

Table of Contents

- Foreword
- 1 Scope
- 2.1 Method summary
- 2.2 Reagents
- 2.3 Instrument

Foreword

YS/T 1046-2015 "copper slag concentrates chemical analysis method" is divided into seven sections.

- Part 1. Determination of copper content iodometry;
- Part 2. Determination of gold and silver atomic absorption spectroscopy and fire assay gravimetric method;
- Part 3. Determination of sulfur content of combustion titration method;
- Part 4. Determination of iron content dichromate method;
- Part 5. Determination of the amount of silica silicon potassium fluoride titration;
- Part 6. aluminum oxide content - Inductively coupled plasma atomic emission spectrometry;
- Part 7. arsenic, antimony, bismuth, lead, zinc, magnesium oxide content - Inductively coupled plasma atomic emission spectrometry.

This is Part 2.

This section is in accordance with GB/T 1.1-2009 given rule drafting.

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

This section is responsible for drafting unit. Daye Nonferrous Metals Group Holdings Limited, Zhongtiaoshan Nonferrous Metals Group Co., Ltd.

This section is drafted. Daye Nonferrous Metals Group Holdings Limited.

Part 1 participated in the drafting unit. Beijing Mining Research Institute, Zhongtiaoshan Nonferrous Metals Group Co., Ltd., Beijing Nonferrous Metal RESEARCH Study General Hospital, Tongling Nonferrous Metals Group Holdings Co., Jiangxi Copper Holdings Limited,

Yanggu Yoshimitsu Copper Co., Chenzhou City Jingui Silver Industry Co., Ltd.

This section participated in the drafting Method 2. Beijing Mining Research Institute, Zhongtiao Shan Nonferrous Metals Group Co., Ltd., Tongling Nonferrous Metals collection Group Holdings Ltd., shares of Jiangxi Copper Company Limited, Yanggu Yoshimitsu Copper Co., Chenzhou City Jingui Silver Industry Co., Ltd., Hunan has Ferrous metals research institute.

1 Scope

YS/T 1046 This section specifies the method for determination of copper slag concentrate silver content.

This section applies to the determination of copper slag concentrate silver content. 1 measuring range of 20.0g/t ~ 400.0g/t; Method 2 Determination Fan Wai is Au0.50g/t ~ 10.00g/t, Ag50.0g/t ~ 400.0g/t.

Copper slag content of silver in concentrate 20.0g/t ~ 50.0g/t range, with this method of arbitration.

2 1 atomic absorption spectrometry silver

2.1 Method summary

Sample with nitric acid, perchloric acid dissolved in hydrochloric acid medium, by atomic absorption spectrometer wavelength at 328.1nm, air - acetylene flame Measuring the absorbance of silver, with a deuterium lamp deduct background absorption, according to the standard curve method to calculate the amount of silver.

2.2 Reagents

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

2.2.1

Ammonium hydrogen fluoride.

2.2.2

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

2.2.3

hydrochloric acid (19).

2.2.4

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

2.2.5

nitric acid (11).

2.2.6

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

2.2.7

Silver standard stock solution. Weigh 0.5000g metallic silver ($w_{\text{Ag}} \geq 99.99\%$) in 200mL beaker, add 20mL of nitric acid (2.2.5), heated until completely dissolved, cooled to room temperature and transferred to 1000mL brown volumetric flask, diluted with water, no chlorine ions to the mark, and mix.

This solution 1mL containing 500 μg silver.

2.2.8

Silver standard solution. Pipette 5.00mL silver standard stock solution (2.2.7) in 250mL flask, diluted with hydrochloric acid (2.2.3) to Volume, and mix. This solution 1mL containing 10 μg silver.

2.3 Instrument

Atomic absorption spectrometer, with a silver hollow-cathode lamp.

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

--- Characteristic concentration. in the measurement sample solution matrix consistent solution, features silver concentration should be less than 0.018 $\mu\text{g/mL}$.

--- Precision. measuring the absorbance of 11 with the highest concentration of the standard, the standard deviation should not exceed the average absorbance of 1.0%, with Solubility lowest concentration standard (not "zero" standard solubility) measuring the absorbance of 11 times, the standard deviation should not exceed the maximum concentration standard 0.5% average standard solution absorbance.

--- Linear curve. the curve according to concentration, divided into five segments, segment than the absorbance difference between the highest and the lowest section of the absorbance difference not less than 0.85.