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

YS/T 536.1-2009

Replacing YS/T 536.1-2006

**Methods for chemical analysis of bismuth. Determination of
copper content. Bis-acetaldehyde-oxalydihydrazone
photometric method**

铋化学分析方法铜量的测定双乙醛草酰二腂分光光度法
(English Translation)

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Foreword

YS/T 536-2009 "Method for chemical analysis of bismuth" is divided into 13 parts.

--- YS /536.1 Methods for chemical analysis of bismuth - Determination of copper content - Bis - acetaldehyde T oxalyl Spectrophotometric Method;

--- YS/T 536.2 Methods for chemical analysis of bismuth - Determination of iron content by electrothermal atomic absorption spectrometry;

--- YS/T 536.3 Methods for chemical analysis of bismuth - Determination of antimony content - Malachite green spectrophotometry;

--- YS/T 536.4 Methods for chemical analysis of bismuth - Determination of silver content - Flame atomic absorption spectrometry and electrothermal atomic absorption spectrometry;

--- YS/T 536.5 Methods for chemical analysis of bismuth - Determination of solid-liquid extraction of zinc content - Flame atomic absorption spectrometry;

--- YS/T 536.6 Methods for chemical analysis of bismuth - Determination of lead content by electrothermal atomic absorption spectrometry;

--- YS/T 536.7 Methods for chemical analysis of bismuth arsenic content - Atomic fluorescence spectrometry;

--- YS/T 536.8 Methods for chemical analysis of bismuth chlorine measured amount of mercury thiocyanate spectrophotometry;

--- YS/T 536.9 Methods for chemical analysis of bismuth - Determination of tellurium

content of arsenic co-precipitation - oscillopolarographic method;

--- YS/T 536.10 Methods for chemical analysis of bismuth - Determination of tin content of beryllium coprecipitation - spectrophotometry;

--- YS/T 536.11 Methods for chemical analysis of bismuth mercury content - Atomic fluorescence spectrometry;

--- Determination of YS/T 536.12 Methods for chemical analysis of nickel content of bismuth electrothermal atomic absorption spectrometry;

--- YS/T 536.13 Methods for chemical analysis of bismuth - Determination of cadmium content by electrothermal atomic absorption spectrometry.

This is Part 1.

The partial replacement of YS/T 536.1-2006 (formerly GB/T 8220.1-1998) "Methods for chemical analysis of bismuth double acetaldehyde hydrazone oxalyl two points Determination of copper content. "Spectrophotometric method. Compared with YS/T 536.1-2006, this section has the following changes.

--- Complements the precision, quality assurance and control provisions;

--- Text format has been modified.

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

This section is Zhuzhou Smelter Group Co., Ltd. is responsible for drafting.

This section drafted by the Zhuzhou Smelter Group Co., Ltd.

This part of the Baiyin Nonferrous Group Co., Ltd., Hunan Chenzhou Mining Co., Ltd. participated in the drafting.

1 Scope

This section provides the determination of copper content of bismuth.

This section applies to the determination of bismuth in copper content. Measurement range (mass fraction). 0.0002% to 0.004%.

2 Method summary

Sample decomposition by nitric acid. In pH8 ~ pH10 ammonia medium, in order to mask body bismuth ammonium citrate, oxalic acid bis double acetaldehyde hydrazone (by the bicyclic the oxalic acid bis cyclohexanone and acetaldehyde hydrazone reaction) with copper to form a stable purple complex in a spectrophotometer at 540nm wavelength absorption measured Luminosity.

3.1 Commercially available reagents

3.1.1

ammonia ($\rho=0.90\text{g/mL}$).

3.1.2

acetaldehyde solution (40%).

3.2 Solution

3.2.1

nitric acid (1 + 1).

3.2.2

ammonium citrate solution (300g/L).

3.2.3

bicyclic cyclohexanone hydrazone oxalic acid bis (BCO) solution (2g/L). Weigh 1.0g oxalic acid bis bicyclic cyclohexanone hydrazone (BCO) placed in 500mL beaker. Was added 100mL ethanol, about 200mL 50 °C water, stirred to dissolve completely. Transferred to 500mL volumetric flask, diluted with water to the mark, and mix.

3.2.4

buffer solution (pH9.2). Weigh 54g ammonium chloride was dissolved in water, aqueous ammonia was added 63mL (3.1.1), diluted with water to 1000mL, and mix.

3.2.5

Neutral Red ethanol solution (0.2g/L).

3.3 Standard solution

3.3.1

copper standard stock solution. Weigh 1.0000g copper (mass fraction of copper $\geq 99.99\%$), placed in 200mL beaker, add 20mL of nitric acid (3.2.1), dissolved by heating, purge of nitrogen oxides, is removed and cooled. Moved into 1000mL volumetric flask, add 10mL nitrate Acid (3.2.1), dilute with water to volume, and mix. 1mL solution containing 1mg of copper.

3.3.2

Copper Standard Solution A. Pipette 5.00mL copper standard stock solution (3.3.1) in 1000mL volumetric flask, dilute to the mark with water Degree, and mix. This solution 1mL containing 5 μg copper.

3.3.3

Copper standard solution B. Pipette 2.00mL copper standard stock solution (3.3.1) in 1000mL volumetric flask, dilute to the mark, Mix well. This solution 1mL containing 2 μ g copper.

4 Instrument

Spectrophotometer.

5.1 Sample

Table 1 sample was weighed, accurate to 0.0001g.