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

YS/T 536.4-2009

Replacing YS/T 536.4-2006

**Methods for chemical analysis of bismuth. Determination of silver
content. Flame atomic absorption spectrophotometric method and
electrothermal atomic absorption spectrometric method**

铋化学分析方法银量的测定火焰原子吸收光谱法和电热原子吸收光谱法

(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 4.

The partial replacement of YS/T 536.4-2006 (formerly GB/T 8220.4-1998) "Methods for chemical analysis of bismuth by flame atomic absorption spectroscopy Determination of the amount of silver "and YS/T 536.13-2006 (formerly GB/T 8220.13-1998)" Methods for chemical analysis of bismuth electrothermal atomic absorption spectrometry Determination of silver and cadmium content "(measuring portion silver content). Compared with YS/T 536.4-2006 and YS/T 536.13-2006, this part 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.

1 Method, flame atomic absorption spectrometry

1 Scope

This section provides Determination of silver content of bismuth.

This section applies to the determination of bismuth silver content. Measurement range (mass fraction). > 0.002% to 0.030%.

2 Method summary

Sample with nitric acid dissolved in hydrochloric acid medium, air - acetylene flame atomic absorption spectrometer at a wavelength of 328.1nm measured silver Absorbance. The standard curve method to calculate the content of silver.

3.1 Commercially available reagents

3.1.1

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

3.1.2

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

3.2 Solution

3.2.1

nitric acid (1 + 1).

3.2.2

hydrochloric acid (1 + 1).

3.2.3

hydrochloric acid (5 + 95).

3.2.4

hydrochloric acid (1 + 99).

3.2.5

bismuth solution. Weigh 10.00g bismuth (Bi mass fraction $\geq 99.999\%$), placed in 250mL beaker was added in 40mL Glass Acid (3.2.1), to be violent reaction was heated until completely dissolved, low temperature evaporation to near dryness, remove, coolish. Added 20mL hydrochloric acid (3.1.1), Low temperature evaporation to near dryness, remove, coolish. Hydrochloric acid was added 40mL (3.2.2), heated to dissolve the salt, boiling, removed and cooled. With hydrochloric acid (3.2.3) was transferred to 100mL volumetric flask and dilute to volume, and mix. 1mL solution containing 0.1g bismuth.

3.3 Standard solution

3.3.1

Silver standard stock solution. Weigh 0.1000g metallic silver (mass fraction of silver $\geq 99.99\%$), placed in 250mL beaker, add 20mL of nitric acid (3.2.1), the cover sheet pan, on low heat until completely dissolved, oxides of nitrogen purge boiling, removed and cooled. Moved 1000mL brown volumetric flask, dilute with water to volume, and mix. This solution 1mL containing 0.1mg silver.

3.3.2

Silver standard solution. Pipette 10.00mL standard silver stock solution (3.3.1) in 100mL brown volumetric flask, nitric acid is added 4mL (3.2.1), dilute with water to volume, and mix. This solution 1mL containing 10 μg silver.

4 Instrument

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

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

--- Characteristic concentration. In line with the measurement of a sample solution matrix solution, features silver concentration should be less than 0.027 μ g/mL.

--- Precision. standard solution measured absorbance of the highest concentration of 10 times, the standard deviation should not exceed the average absorbance of 1.0%;