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

YS/T 536.13-2009

Replacing YS/T 536.13-2006

**Methods for chemical analysis of bismuth. Determination of
cadmium content. Electrothermal atomic absorption
spectrometric method**

铋化学分析方法镉量的测定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 13.

The partial replacement of YS/T 536.13-2006 (formerly GB/T 8220.13-1998) "Methods for chemical analysis of bismuth electrothermal atomic spectrometry Determination of silver and cadmium content. " Compared with YS/T 536.13-2006, this section has the following changes.

--- Text format has been modified;

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

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 section from Guangzhou Nonferrous Metal Research Institute, Liaoning SAIEC IQ participate in the drafting.

1 Scope

This section provides the determination of bismuth in the amount of cadmium.

This section applies to the determination of bismuth in the amount of cadmium.

Measurement range (mass fraction). 0.00005% ~ 0.0002%.

2 Method summary

Sample decomposition with nitric acid, the amount of solution into electrothermal atomizer, atomic absorption spectrometer wavelength 228.8nm measured cadmium Absorbance, drawing working curve with substrate addition method, the content of cadmium in a sample obtained.

3 Reagents

Preparation of the test solution and water are a water vessel used in the experiments after soaked in dilute nitric acid, washed with water level.

3.1 Commercially available reagents

Nitric acid ($\rho=1.42\text{g/mL}$), pure class distinctions.

3.2 Solution

3.2.1

nitric acid (1 + 1).

3.2.2

nitrate (98 + 2).

3.2.3

bismuth solution (100mg/mL). Weigh 10.00g bismuth (Bi mass fraction $\geq 99.999\%$), in the 250mL beaker high type, add 40mL of nitric acid (3.2.1), a low temperature heating dissolved completely, removed and cooled. Transferred to 100mL volumetric flask with 5mL nitric acid (3.2.1) Rinse the beaker, into the flask, diluted with nitric acid (3.2.2) to the mark and mix.

3.3 Standard solution

3.3.1

cadmium standard stock solution. Weigh 1.0000g cadmium (cadmium mass fraction $\geq 99.99\%$) in 100mL beaker, add 20mL nitrate Acid (3.2.1), cover the surface of the pan, over low heat to dissolve completely removed and cooled. The solution is transferred to 1000mL volumetric flask, dilute with water to Volume, and mix. This solution 1mL 1mg containing cadmium.

Cadmium 3.3.2 Standard Solution A. Pipette 2.00mL cadmium standard stock solution (3.3.1) in 200mL volumetric flask, with nitric acid (3.2.2) diluted Diluted to volume, and mix. This solution 1mL containing 10 μg cadmium.

3.3.3

cadmium standard solution B. Pipette 2.00mL cadmium standard solution A (3.3.2) in 200mL volumetric flask, dilute with nitric acid (3.2.2) to the mark, and mix. This solution 1mL containing 0.1 μg cadmium.

4 Instrument

Graphite furnace atomic absorption spectrometry (background buckle device) attached cadmium hollow cathode lamp.

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

--- Quality features. the measurement of the sample solution in the matrix phase consistent solution features quality cadmium should not exceed 0.2pg.

--- Precision. absorbance measured 10 times the highest concentration of the standard solution, the standard deviation should not exceed 2.0% of the mean absorbance;

With the lowest concentration of standard solution (not "zero" concentration of the standard) measuring the absorbance of 10 times, the standard deviation should not exceed the maximum 1.5% concentration of the standard average absorbance.

--- Linear curve. The curve is divided into five sections according to concentration, absorbance difference between the absorbance difference between the highest and the lowest segment of the segment Ratio of not less than 0.8.