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**YS**

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

**YS/T 536.9-2009**

Replacing YS/T 536.9-2006

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**Methods for chemical analysis of bismuth. Determination of  
tellurium content. Coprecipitation with  
arsenic-oscillopolarographic method**

铋化学分析方法碲量的测定砷共沉淀-示波极谱法

**(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.

Part is divided into 9 parts.

The partial replacement of YS/T 536.9-2006 (formerly GB/T 8220.9-1998) "Methods for chemical analysis of bismuth arsenic co-precipitation - OSCILLOPOLAROGRAPHIC Determination of tellurium content. " Compared with YS/T 536.9-2006, 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 is Shuikoushan Nonferrous Metals Group Co., Ltd., a limited liability company Shizhuyuan participated in the drafting.

## 1 Scope

This section provides the determination of tellurium content of bismuth.

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

Measurement range (mass fraction). 0.0002% to 0.0015%.

## 2 Method summary

Sample decomposition with nitric acid, in 6mol/L HCl medium, copper sulfate as catalyst, arsenic co-precipitation with tellurium, and it separated from the body, in Sulfuric acid - base solution of sodium chloride, in a very oscilloscope spectrometer peak potential -0.85V measured peak current, the standard curve method to calculate the amount of tellurium.

### 3.1 Commercially available reagents

**3.1.1**

hypophosphite.

**3.1.2**

hydrochloric acid ( $\rho$ 1.19g/mL), pure class distinctions.

**3.1.3**

nitrate ( $\rho$ 1.42g/mL), pure class distinctions.

**3.1.4**

perchloric acid ( $\rho$ 1.67g/mL), pure class distinctions.

**3.2 Solution**

**3.2.1**

hydrochloric acid (1 + 1).

**3.2.2**

nitric acid (1 + 2).

**3.2.3**

sulfuric acid (1 + 1).

**3.2.4**

sodium hydroxide solution (200g/L).

**3.2.5**

sodium chloride solution (300g/L), pure class distinctions.

**3.2.6**

copper sulfate solution ( $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , 100g/L).

**3.2.7**

hydroxylamine hydrochloride solution (200g/L), the time is now equipped with.

**3.2.8**

hydrochloric acid lotion. 500mL of hydrochloric acid (1 + 11) was added 1g sodium hypophosphite.

**3.2.9**

Saturated bromine nitrate. nitric acid was added an appropriate amount of bromine to reach saturation.

### 3.2.10

methyl red ethanol solution (0.5g/L).

### 3.2.11

arsenic solution. Weigh 0.66g of arsenic trioxide (arsenic mass fraction  $\geq 99.9\%$ , sulfuric acid in advance drier 24h) to 100mL beaker, add 20mL sodium hydroxide solution (3.2.4), dissolved by heating, cooling, transferred to 500mL volumetric flask, dilute to Volume, and mix. This solution 1mL 1mg containing arsenic.

### 3.2.12

bismuth solution. Weigh 0.5g of bismuth (Bi mass fraction  $\geq 99.999\%$ ) placed in 150mL beaker, add 5mL nitric acid (3.2.2), dissolved by heating, remove, add 3mL perchloric acid (3.1.4), steamed to smoke, remove, cool. Purge water table and then steamed dish and cup wall to smoke, removed, cooled and 10mL of perchloric acid (3.1.4) and transferred to 250mL volumetric flask, dilute with water to volume, and mix. This solution 1mL solution containing 2mg bismuth.

## 3.3 Standard solution

### 3.3.1

tellurium standard stock solution. Weigh 0.1000g tellurium (Te mass fraction  $\geq 99.99\%$ ), placed in 200mL beaker, add 10mL of nitric acid (3.2.2), dissolved by heating, removed and cooled. Added 3mL perchloric acid (3.1.4), steamed to smoke, remove, cool. Blowing water Wash table dish and cup wall and then steamed to smoke, removed, cooled and 10mL of perchloric acid (3.1.4) and transferred to 1000mL volumetric flask, diluted with water