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YS

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

YS/T 226.1-2009

Replacing YS/T 226.1-1994

**Methods for chemical analysis of selenium. Part 1:
Determination of bismuth content. Hydride generation-atomic
fluorescence spectrometry**

硒化学分析方法 第1部分：铋量的测定氢化物发生-原子荧光光谱法
(English Translation)

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Foreword

YS/T 226 "selenium chemical analysis method" is divided into 13 parts.

--- Part 1. Determination of bismuth content - Hydride Generation - Atomic Fluorescence Spectrometry

--- Part 2. Determination of antimony content Hydride Generation - Atomic Fluorescence Spectrometry

--- Part 3. Determination of aluminum content Chromazurol S- cetylpyridinium bromide spectrophotometric method

--- Part 4. Determination of mercury content of dithizone - CTC colorimetric titration

--- Part 5. Determination of the amount of silicon molybdenum blue spectrophotometry

--- Part 6. Determination of sulfur content symmetrical diphenyl semicarbazide spectrophotometry

--- Part 7. Determination of magnesium content - Flame atomic absorption spectrometry

--- Part 8. Determination of copper content - Flame atomic absorption spectrometry

--- Part 9. Determination of iron content by flame atomic absorption spectrometry

--- Part 10. Determination of nickel content by flame atomic absorption spectrometry

--- Part 11. Determination of lead content by flame atomic absorption spectrometry

--- Part 12. Determination of the amount of selenium sodium thiosulfate volumetric method

--- Part 13. silver, aluminum, arsenic, boron, mercury, bismuth, copper, cadmium, iron, gallium, indium, magnesium, nickel, lead, silicon, antimony, tin, tellurium, titanium, zinc contents Inductively Coupled Plasma Mass Spectrometry this section YS/T Part 1 226.

The partial replacement of YS/T 226.1-1994 "selenium in determining the amount of bismuth potassium iodide, thiourea, strychnine spectrophotometry", and YS/T 226.1-1994

compared, this section there are major changes as follows.

--- By the potassium iodide - brucine spectrophotometry to hydride generation - atomic fluorescence spectrometry.

--- Measurement range expanded from 0.0002% ~ 0.0020 to 0.0002% to 0.010%.

--- Supplementary terms of quality assurance and control, increasing the precision of the terms.

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

This section is responsible for drafting unit. Jinchuan Group Limited.

This section is drafted. Guangzhou Nonferrous Metal Research Institute.

Participated in the drafting of this section. Jinchuan Group Ltd., Tongling Nonferrous Metals Group Holdings Limited.

1 Scope

This section YS/T 226 specifies the method for determination of selenium bismuth content.

This section applies to the determination of the amount of bismuth selenide. Measurement range. 0.0002% to 0.010%.

2 Method summary

Sample with nitric acid, hydrochloric acid dissolved in 5mol/L ~ 6mol/L HCl medium, with hydroxylamine chloride restore selenium to elemental selenium, and it Impurity elements separated. In hydrochloric acid medium with potassium borohydride as a reducing agent, with argon as the carrier gas, and the resulting hydride introduced into a quartz furnace atomic Gasifier, the fluorescence intensity was measured on bismuth atomic fluorescence spectrometer.

3 Reagents and materials

Unless otherwise indicated, the reagents used in the analysis of analytical grade reagent, analysis of water in distilled water or equivalent purity.

3.1

hydroxylamine chloride.

3.2

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

3.3

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

3.4

nitric acid (1 + 1).

3.5

HCl (1 + 1).

Hydrochloride 3.6 (1 + 9).

3.7

solution of potassium borohydride (15g/L). Weigh 7.5g of potassium borohydride were dissolved in 500mL of potassium hydroxide solution (5g/L), and now with the current.

3.8

thiourea - ascorbic acid solution (50g/L + 50g/L). Weigh respectively thiourea, ascorbic acid each 25g, dissolved in water and diluted to 500mL, now with the current.

3.9

bismuth standard stock solution. Weigh 0.5000g metal bismuth (Bi mass fraction $\geq 99.95\%$) placed in 250mL beaker, add 50mL of nitric acid (3.4), cover sheet pan, over low heat until completely dissolved in a hot plate, remove the cooled and transferred to previously added 150mL nitric acid (3.4) of 1000mL volumetric flask, dilute with water to volume, and mix. This solution 1mL containing 500 μg bismuth.

3.10

Standard bismuth Solution A. Pipette 10.00mL standard bismuth stock solution (3.9) was placed in 250mL volumetric flask, 25mL of nitric acid was added (3.4), dilute to the mark and mix. This solution 1mL containing 20 μg bismuth.

3.11

bismuth standard solution B. Pipette 10.00mL bismuth standard solution A (3.10) into 200mL volumetric flask, was added 20mL of hydrochloric acid (3.5), dilute to the mark and mix. This solution 1mL containing 1 μg bismuth.

3.12

argon ($\text{Ar} \geq 99.99\%$).

4 Instrument

Atomic fluorescence spectrometer, with bismuth special hollow cathode lamps and intermittent flow sampling device.

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

used.

--- Detection limit. not more than 1ng/mL.

--- Precision. with 100ng/mL standard solution of bismuth fluorescence intensity was measured 10 times, and the standard deviation should not exceed the mean fluorescence intensity 5.0%.