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

YS/T 519.4-2009

Replacing YS/T 519.4-2006

**Methods for chemical analysis of arsenic. Part 4: Determination
of bismuth, antimony and sulfur content. Inductively coupled
plasma atomic emission spectrometry**

砷化学分析方法 第4部分：铋、锑、硫量的测定电感耦合等离子体原子发射光谱
法

(English Translation)

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Foreword

YS/T 519-2009 "chemical analysis of arsenic" is divided into four parts.

- Part 1. Determination of arsenic content potassium bromate titration;
- Part 2. Determination of antimony content - Malachite green spectrophotometry;
- Part 3. Determination of sulfur content of barium sulfate gravimetric method;
- Part 4. bismuth, antimony, sulfur content - Inductively coupled plasma atomic emission spectrometry.

This section YS/T Part 4 519.

The partial replacement of YS/T 519.4-2006 (formerly GB/T 4373.4-1984) "Methods for chemical analysis of arsenic dithio antipyrine Methane spectrophotometric determination of bismuth content. " Compared with YS/T 519.4-2006, this section has the following changes.

- The dithiobis antipyrine methane photometric method to inductively coupled plasma atomic emission spectrometry;
- Increase the determination of antimony and sulfur content;
- Sample size proposed new requirements, the specimen shall be subject to an 80-mesh sieve, diameter of not more than 2mm, to sample all through 0.84mm sieve, and then 0.42mm sieve;
- Symmetry like proportions were modified by the press on the screen and under the screen ratio of 3 Weigh, modify according to the actual proportion sieve weighed;
- 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.

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1 Scope

YS/T 519 This part provides for bismuth, antimony, arsenic determination of sulfur content in.

This section applies to bismuth, antimony, arsenic and sulfur content determination.

Measurement range. Bi. 0.01 to 0.25%, Sb. 0.01 to 0.65%, sulfur.

0.005% to 0.60%.

2 Method summary

Sample with nitric acid - a saturated solution of dissolved potassium chlorate, constant volume of water, the use of standard solutions and the sample solution Arsenic matrix matches with Inductively coupled plasma atomic emission spectrometer bismuth, antimony, sulfur content simultaneously.

3 Reagents

Analysis process unless otherwise specified, all using the same analytical reagent and distilled water or purified water.

3.1

high-purity arsenic ($As \geq 99.999\%$).

3.2

nitric acid - a saturated solution of potassium. The potassium chlorate was added nitric acid ($\rho 1.42\text{g/mL}$), and shake to dissolve, until there is an excess of solid chlorine Insoluble potassium date (two weeks available).

3.3

arsenic substrate solution (25g/L). Weigh 2.50g high-purity arsenic (3.1), placed in 250mL beaker with water wet, add 50mL of nitric acid -A saturated solution of potassium chlorate (3.2), cover the surface of the pan, until the violent reaction stopped after the heating furnace is set to dissolve completely, remove the cooling water purge Petri dish and cup wall and transferred to 100mL volumetric flask with water to volume, and mix.

3.4

sulfur standard solution (0.3mg/mL). Weigh 1.6304g potassium sulfate (reference reagents before use by 120 °C drying 2h), placed in 150mL Beaker, add water to dissolve 50mL,

transferred to 1000mL volumetric flask, dilute with water to volume, and mix. This solution containing 1mL 0.3mg sulfur.

3.5

nitric acid - tartaric acid solution. Weigh 1g of tartaric acid dissolved in a small amount of water, adding 3mL nitric acid, diluted with water to 100mL.

3.6

bismuth standard stock solution (1mg/mL). Weigh 0.5000g bismuth ($\text{Bi} \geq 99.99\%$), placed in 150mL beaker, add 10mL water, 10mL of nitric acid, dissolved by heating, steam continues to 1mL ~ 2mL, plus 20mL of nitric acid (1 + 9) was boiled and cooled. Moved 500mL flask, with nitric acid (1 + 9) diluted to the mark, and mix. This solution 1mL 1mg containing bismuth.

3.7

Antimony standard stock solution (1mg/mL). Weigh 0.2000g metal antimony ($\text{Sb} \geq 99.99\%$), placed in 150mL beaker, add 20g tartaric acid, 20mL of nitric acid (1 + 3), cover the surface of the pan, set on a hot plate heated to dissolve completely, boil for a moment, remove the cooling. With nitrate Acid - tartaric acid solution (3.5) and Beibi purged dish surface and transferred to 200mL volumetric flask, and dilute to volume, and mix. This solution containing 1mL 1mg antimony.

Bi 3.8 Sb mixed standard solution. Pipette 10mL bismuth standard stock solution (3.6) and 20mL antimony standard stock solution (3.7) in 100mL Flask, nitrate - tartaric acid solution (3.5) diluted to the mark, and mix the solution 1mL containing 0.1mg and 0.2mg bismuth antimony.

3.9

series of standard solution. Pipette 20.00mL arsenic substrate solution (3.3) in a 100mL flask were added 0.00mL, 0.50mL, 2.50mL, 5.00mL, 10.00mL sulfur standard solution (3.4) and 0.00mL, 0.50mL, 2.50mL, 7.50mL, 20.00mL bismuth antimony mixed standard solution (3.8) with water to volume, and mix. The concentration of this series of standard sulfur were 0 $\mu\text{g/mL}$, 1.50 $\mu\text{g/mL}$, 7.50 $\mu\text{g/mL}$, 15.00 $\mu\text{g/mL}$, 30.00 $\mu\text{g/mL}$, concentration of antimony was 0 $\mu\text{g/mL}$, 1.00 $\mu\text{g/mL}$,