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

YS/T 281.12-2011

Replacing YS/T 281.12-1994

**Methods for chemical analysis of cobalt. Part 12: Determination
of arsenic, antimony, bismuth, tin and lead content.
Electrothermal atomic absorption spectrometry**

钴化学分析方法 第12部分：砷、锑、铋、锡、铅量的测定电热原子吸收光谱法
(English Translation)

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Foreword

YS/T 281 "cobalt chemical analysis method" is divided into the following 20 parts.

Part 1. Determination of iron content - Sulfosalicylic acid spectrophotometric method Part 2. Determination of aluminum content - Chromazu S spectrophotometric method Part 3. Determination of silicon content - Molybdenum blue spectrophotometric method Part 4. Determination of arsenic content - Molybdenum blue spectrophotometric method - Part 5. Determination of phosphorus content - Molybdenum blue spectrophotometric method Part 6. Determination of magnesium content - Flame atomic absorption spectrometric method - Part 7. Determination of zinc content - Flame atomic absorption spectrometric method Part 8. Determination of cadmium content - Flame atomic absorption spectrometric method Part 9. Determination of lead content - Flame atomic absorption spectrometric method Part 10. Determination of nickel content - Flame atomic absorption spectrometric method - Part 11. Determination of copper and manganese - Flame atomic absorption spectrometric method - Part 12. Determination of arsenic, antimony, bismuth, tin and lead - Electrothermal atomic absorption spectrometry - Part 13. Determination of sulfur content - High frequency induction furnace combustion infrared absorption method - Part 14. Determination of carbon content - High frequency induction furnace combustion infrared absorption method - Part 15. Determination of arsenic, antimony and bismuth - Hydride generation - atomic fluorescence spectrometry - Part 16. Determination of the amount of arsenic, cadmium, copper, zinc, lead, bismuth, tin, antimony, silicon, manganese, iron, nickel, aluminum and magnesium.

Spectrum method

- Part 17. Determination of aluminum, manganese, nickel, copper, zinc, cadmium, tin, antimony, lead and bismuth inductively coupled plasma mass spectrometry - Part 18. Determination of sodium content - Flame atomic absorption spectrometric method - Part 19. Determination of calcium, magnesium, manganese, iron, cadmium and zinc - Inductively coupled plasma emission spectrometric method - Part 20. Determination of the amount of oxygen - Infrared absorption method this section is part 12 of YS/T 281.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

Part 1. YS/T 281.12-1994 "Chemical analysis of cobalt - Determination of arsenic, antimony, bismuth, tin and lead by electrothermal atomic absorption spectrometry the amount".

Compared with YS/T 281.12-1994, this section mainly has the following changes.

--- The text format has been modified to supplement the quality assurance and control terms, increasing the repeatability and reproducibility limits;

- Added the requirements for the test report.

This part of the National Nonferrous Metals Standardization Technical Committee (SAC/TC243) proposed and centralized.

This standard is responsible for drafting units. Jinchuan Group Co., Ltd., Beijing Mining and Metallurgy Research Institute.

This part is responsible for drafting units. Beijing Mining and Metallurgy Research Institute.

This part participates in the drafting unit. Jinchuan Group Co., Ltd., Yantai Penghui Copper Co., Ltd.

1 Scope

This part of YS/T 281 specifies the determination of arsenic, antimony, bismuth, tin and lead in cobalt.

This part is applicable to the determination of arsenic, antimony, bismuth, tin and lead in cobalt. Measuring range. 0.00020% ~ 0.0015%.

2 Method summary

The sample was decomposed with nitric acid. A certain volume of the solution into the electrothermal atomizer, with the atomic absorption spectrometer, in the elements of a specific wave the absorbance of each element is measured separately.

The standard solution contains the same concentration of cobalt matrix as the test solution.

3 Reagent

If no special instructions, the reagents used for the analysis of pure reagents, preparation and analysis of water are secondary distilled water or considerable purity of the experiment Room water. The containers used in the experiments were thoroughly soaked with nitric acid (3.3) and thoroughly washed with water.

3.1

High purity cobalt ($w_{\text{Co}} \geq 99.98\%$, w_{As} , w_{Sb} , w_{Bi} , w_{Sn} , $w_{\text{Pb}} \geq 99.99\%$) placed in 150mL beaker,

add 20mL nitric acid (3.3) cover the dish, in the hot plate at low temperature heating to completely dissolved, boil off the nitrogen oxide. Remove, cool to room temperature, move into containing 20mL Nitric acid (3.3) in a.200 mL volumetric flask, mixed with water and mixed. This solution 1mL containing 1mg of lead.

3.6

bismuth standard storage solution. Weigh 0.2000g of metal bismuth ($w_{Bi} > 99.95\%$) placed in 150mL, beaker, add 20mL nitric acid (3.3), cover the dish, in the hot plate at low temperature heating to completely dissolved, boil off the nitrogen oxide. Remove, cool to room temperature, into the possession 20 mL of nitric acid (3.2) in a.200 mL volumetric flask, mixed with water and mixed. This solution 1mL containing 1mg bismuth.

3.7

arsenic standard storage solution. Weigh 0.2000g metal arsenic ($w_{As} > 99.95\%$) placed in 150mL, beaker, add 20mL nitric acid (3.3), cover the dish, in the hot plate at low temperature heating to completely dissolved, boil off the nitrogen oxide. Remove, cool to room temperature, into the possession 20 mL of nitric acid (3.3) in a.200 mL volumetric flask, mixed with water and mixed. This solution 1mL containing 1mg arsenic.

Note: If the surface of the metal arsenic is oxidized, can be 4% sodium hydroxide solution soaked to appear metallic luster after removal, washed with distilled water and then remove the absolute ethanol Moisture, blotted with filter paper and weighed.

3.8

antimony standard storage solution. accurately weighed 0.2740g antimony potassium tartrate in 150mL beaker, add 50mL water dissolved, into the 100mL Capacity bottles, water volume, mix. This solution 1mL containing 1mg antimony.

Note: The solution will soon form a mold, should be fresh preparation. The dilute acidic solution is stable.