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

YS/T 281.5-2011

Replacing YS/T 281.5-1994

**Methods for chemical analysis of cobalt. Part 5: Determination
of phosphorus content. Molybdenum blue spectrophotometry**

钴化学分析方法 第5部分：磷量的测定钼蓝分光光度法

(English Translation)

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Table of Contents

Foreword
1 Scope
2 Method summary
3 Reagent

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 part is part 5 of YS/T 281.

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

This part replaces YS/T 281.5-1994 "cobalt chemical analysis method molybdenum blue spectrophotometric determination of phosphorus". With YS/T 281.5-1994, this section has the following main changes.

--- the determination range from 0.0005% to 0.005% modified to 0.00020% ~ 0.0050%;

--- extractant from trichloromethane - n-butanol to isobutanol;

The method of dissolving from nitric acid to mixed acid;

--- 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 Research Institute.

This part is responsible for drafting units. Beijing Nonferrous Metals Research Institute.

This part participates in the drafting unit. Jinchuan Group Co., Ltd., Jiangsu Kailike Cobalt Industry Co., Ltd.

1 Scope

This part of YS/T 281 specifies the determination of phosphorus content in cobalt.

This part is applicable to the determination of phosphorus in cobalt, the determination range. 0.00020% ~ 0.0050%.

2 Method summary

The sample is dissolved in a mixed acid. In the sulfuric acid medium, the phosphomolybdic heteropolyacid produced by orthophosphoric acid and ammonium molybdate can be extracted with isobutanol, the phosphorous molybdenum heteropolyacid was reduced and the absorbance was measured at a wavelength of 620 nm at a spectrophotometer.

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.

3.1

isobutanol.

3.2

hydrochloric acid ($\rho = 1.19\text{g/mL}$), mos grade.

3.3

nitric acid ($\rho = 1.42\text{g/mL}$), mos grade.

3.4

sulfuric acid ($\rho = 1.84\text{g/mL}$), mos grade.

3.5

Hydrogen peroxide ($\rho = 1.1\text{g/mL}$), mos grade.

3.6

Mixed acid. V (nitric acid). V (hydrochloric acid). V (water) = 3. 1. 6.

3.7

Ammonium molybdate solution. 100 g/L.

3.8

Sulfuric acid. 3.0 mol/L.

3.9

sulfuric acid (0.25mol/L). 1000mL0.25mol/L sulfuric acid and 100mL isobutanol fully mixed.

3.10

sulfuric acid. 0.5mol/L.

3.11

Stannous chloride solution (10 g/L). 1 g of stannous chloride ($\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$) was dissolved in 10 mL of hydrochloric acid (3.2) and diluted with water 100mL. When used with the current allocation.

3.12

phosphorus standard storage solution. Weigh 0.2195g potassium dihydrogen phosphate (pre-dried from $105^\circ\text{C} \sim 110^\circ\text{C}$ to constant weight), soluble in water , Add 10mL nitric acid (3.3), into the 1000mL volumetric flask, the water volume, mix, stored in plastic bottles. This solution contains 1mL 50 μg of phosphorus.

3.13

Phosphorus standard solution. Remove 20.00mL phosphorus standard storage solution (3.12) placed in 1000mL volumetric flask, the water volume, mix.

This solution 1mL containing 1μg of phosphorus.