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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 5124.3-2017

**Hard metals -- Part 3: Determination of cobalt -- Potentiometric
method**

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5.3 Hydrofluoric acid, $\rho = 1.12 \text{ g/mL}$.

5.4 Nitric acid, $\rho = 1.42 \text{ g/mL}$.

5.5 Sulfuric acid, $\rho = 1.84 \text{ g/mL}$.

5.6 Ammonia, $\rho = 0.91 \text{ g/mL}$.

5.7 Ammonium citrate solution

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Foreword

GB/T 5124 "Carbide chemical analysis method" is divided into four parts.

- Part 1. Determination of total carbon content Gravimetric method;
- Part 2. Determination of insoluble (free) carbon content Gravimetric method;
- Part 3. Determination of cobalt content potentiometric titration;
- Part 4. Determination of titanium content hydrogen peroxide spectrophotometry.

This section GB/T 5124 Part 3.

This section drafted in accordance with GB/T 1.1-2009 given rules.

This section instead of GB/T 5124.3-1985 "Carbide chemical analysis potentiometric titration of cobalt," and GB/T 5124.3-

The main changes compared to 1985 are as follows.

- "4.3 calomel electrode or tungsten electrode" to "6.3 tungsten electrode or other reference electrode";
- Replace the "Calculation of 7 Analysis Results" with "Expression of 9 Analysis Results"

and add "The calculation result is accurate to 0.01%";

--- "8 allowable difference" to "9.3 allowable difference", and added "9.4 The final result to pass the arithmetic mean of the measured value of

Report the results, accurate to 0.1%. "

This section uses the translation method identical with ISO 3909.1976 "Determination of cobalt carbide potentiometry titration."

This part is proposed by China Nonferrous Metal Industry Association.

This part of the National Non-ferrous Metal Standardization Technical Committee (SAC/TC243) centralized.

This section is responsible for the drafting unit. Zhuzhou Cemented Carbide Group Co., Ltd., Shenzhen Note into Technology Co., Ltd., non-ferrous metal technology

Economic Research Institute.

1 Scope

GB/T 5124 provisions of this part of the potential titration Determination of cobalt carbide.

2 scope of application

GB/T 5124 This section applies to carbide and bonded metal powder (no lubricant) and various grades of pre-sintering or sintering

Determination of cobalt content in cemented carbide. Measurement range. 1% (mass fraction) or more.

3 method principle

In strong ammonia medium with an excess of potassium ferricyanide (III) cobalt is oxidized to trivalent. Titration with cobalt sulfate solution potentiometric titration excess

Potassium ferricyanide.

4 interference element

The effects of interfering elements such as vanadium and manganese should be considered. Vanadium and manganese are also oxidized by potassium ferricyanide (III). Vanadium participates in the reaction quantitatively

Content less than 0.5% (mass fraction) can be corrected.

If the total amount of tantalum and niobium in the sample is less than 0.02% (mass fraction), then the amount of manganese can be as high as 0.2% (mass fraction)

quantitative reaction. If tantalum niobium

This method is valid only when the total amount exceeds 0.02% (mass fraction) and the amount of manganese is less than 0.03% (mass fraction).

5 reagent

Only analytical reagents identified as analytical grade and distilled or corresponding pure water are used in the analysis.

5.7 Ammonium citrate solution

Dissolve 100g of citric acid in 900mL of water and add 100mL of aqueous ammonia (5.6).

5.8 cobalt sulfate standard solution, 1L containing 3g cobalt.

Cobalt standard solution with dense metal cobalt can also be formulated with ammonium or ammonium sulfate. When necessary, its concentration can be 1 - nitroso -

2-naphthol gravimetric or electrolytic calibration.

5.9 Potassium ferricyanide (III) standard titration solution, 1L is equivalent to about 3g cobalt.

17 g of $K_3[Fe(CN)_6]$ was dissolved in 1 L of water and mixed. The following method was used to determine cobalt sulfate standard solution (5.8) and ferricyanide