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

YS/T 1157.1-2016

**Methods for chemical analysis of crude cobalt hydroxide-Part 1:
Determination of cobalt content-Potentiometric titration method**

粗氢氧化钴化学分析方法 第1部分：钴量的测定 电位滴定法

(English Translation)

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Foreword

YS/T 1157 "crude cobalt hydroxide chemical analysis method" is divided into the following four parts.

--- Part 1. Determination of cobalt content potentiometric titration;

--- Part 2. Determination of nickel, copper, iron, manganese, zinc, lead, arsenic and cadmium; Inductively coupled plasma atomic emission spectrometry;

--- Part 3. Determination of calcium and magnesium content Flame atomic absorption spectrometry and inductively coupled plasma atomic emission spectrometry;

--- Part 4. Determination of manganese content Potentiometric titration.

This part is the first part of YS/T 1157.

Method 1 of this section is masking manganese - potentiometric titration; Method 2 is manganese reduction - potentiometric titration.

Method 1 in this part of the arbitration analysis.

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

This part of the National Non-ferrous Metals Standardization Technical Committee (SAC/TC243) and focal point.

This part of the drafting unit. Jinchuan Group Co., Ltd., Zhejiang Huayou Cobalt Co., Ltd., Green United States Co., Ltd., Beijing Mining and Metallurgical Research Institute, Yingde Jia satisfied Metal Technology Co.,

1 Scope

YS/T 1157 provisions of this part of the crude cobalt hydroxide cobalt content determination.

This section applies to the determination of cobalt content in crude cobalt hydroxide. The

measurement range is 20.00% ~ 55.00%.

2.1 Method summary

In the presence of perchloric acid and phosphoric acid, the sample oxidizes manganese to Mn^{3+} to form manganese phosphate to mask the interference of coexisting elemental manganese. In citric acid Salt exists in the ammonia solution, with potassium ferricyanide solution Co^{2+} oxidation Co^{3+} , excessive potassium ferricyanide Potentiometric titration with cobalt standard Titration solution back titration.

2.2 Reagents

Unless otherwise stated, only reagents identified as analytical grade were used in the analysis. The water used was either laboratory grade 3 water or water of comparable purity.

2.2.1

Ammonium hydrogen fluoride.

2.2.2

Perchloric acid ($\rho = 1.67 \text{ g/mL}$).

2.2.3

Phosphoric acid ($\rho = 1.69 \text{ g/mL}$).

2.2.4

Ammonia ($\rho = 0.90 \text{ g/mL}$).

2.2.5

Hydrochloric acid (1:1).

2.2.6

ammonium citrate solution (300g/L).

2.2.7

Cobalt standard titration solution Weigh 1.0000g cobalt metal ($w_{Co} \geq 99.95\%$), add 20mL nitric acid (1:1), after low temperature dissolved, Add 10mL of sulfuric acid (1:1), steamed to white smoke, remove the cooling, wash the watch glass and cup wall with water, heat to dissolve salt, cooled and moved into 1000mL volumetric flask, diluted with water to the mark, mix well. 1mL of this solution contains 1mg of cobalt.

2.2.8 Potassium ferricyanide standard solution

2.2.8.1

Preparation. Weigh 5.6g potassium ferricyanide, add about 250mL water dissolved, filtered and diluted to 1000mL with water, and mix. Stored in Brown bottle.

2.2.8.2

Calibration In a.200mL beaker, add 30mL ammonium citrate solution (2.2.6), 30mL ammonia (2.2.4), accurately added 15.00mL potassium ferricyanide standard solution (2.2.8.1), mix well. On the potentiometer, place the redox electrode (2.3.2) in the beaker Constantly titrated with cobalt standard titration solution (2.2.7) Titration to the maximum potential jump is the end of the jump.

Calculate the conversion factor of potassium ferricyanide standard solution to cobalt standard titration solution according to equation (1).

$$k = V_1V_2$$

In the formula.

k --- conversion factor, the unit volume of potassium ferricyanide standard solution consumed cobalt standard titration solution volume;

V₁ --- back titration consumption of cobalt standard solution ml, in milliliters (mL);