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

YS/T 953.1-2014

**Methods for chemical analysis of fire smelting nickel substrate material
- Part 1: Determination of nickel content - Dimethylglyoxime
spectrophotometric method and dimethylglyoxime gravimetric method**

火法冶炼镍基体料化学分析方法 第1部分：镍量的测定丁二酮肟分光光度法和
丁二酮肟重量法

(English Translation)

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Foreword

YS/T 953 "Methods for chemical analysis of fire smelting nickel substrate material" is divided into 11 parts.

- Part 1.Determination of nickel content - Dimethylglyoxime spectrophotometric method and dimethylglyoxime gravimetric method;
- Part 2.Determination of silicon content - Molybdosilicate blue spectrophotometric method and perchloric acid dehydration gravimetric method;
- Part 3.Determination of phosphorus content - Bismuth phosphomolybdate blue spectrophotometric method;
- Part 4.Determination of chrome content - Ammonium ferrous sulfate titration method;
- Part 5.Determination of manganese content - Potassium periodate spectrophotometric method;
- Part 6.Determination of cobalt content - 5-Cl-PADAB spectrophotometric method and flame atomic absorption spectrometric method;
- Part 7.Determination of copper content - BCO spectrophotometric method and flame atomic absorption spectrometric method;
- Part 8.Determination of iron content - Titanium trichloride reduction-potassium dichromate titrimetric method;

- Part 9.Determination of carbon and sulfur contents - Infrared absorption method after high frequency combustion;
- Part 10.Determination of nickel, chromium, manganese, cobalt, copper and phosphorus contents - Inductively coupled plasma atomic emission spectrometric method;
- Part 11.Determination of Lead, Arsenic, Cadmium and Mercury contents - Inductively coupled plasma-mass spectrometric method.

This Part is Part 1 of YS/T 953.Method 2 is the arbitration method.

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

This Part shall be under the jurisdiction of National Technical Committee 243 on Nonferrous Metals of Standardization Administration of China (SAC/TC 243).

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Methods for chemical analysis of fire smelting nickel
substrate material - Part 1. Determination of nickel
content - Dimethylglyoxime spectrophotometric
method and dimethylglyoxime gravimetric method

1 Scope

This Part of YS/T 953 specifies the dimethylglyoxime spectrophotometric method and dimethylglyoxime gravimetric method for the determination of nickel content in the fire smelting nickel substrate material.

This Part applies to the determination of nickel content in the fire smelting nickel substrate material. The determination range of Method 1 is 0.50%~5.00%. The determination range of Method 2 is 1.00%~25.00%.

2 Normative references

The following documents are indispensable for the application of this document.

For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 20066 Steel and iron - Sampling and preparation of samples for the determination of chemical composition

3 Method 1 - Dimethylglyoxime spectrophotometric

method

3.1 Method summary

USE hydrochloric acid and nitric acid to dissolve the test portion. USE potassium sodium tartrate as a masking agent; in an alkaline medium of sodium hydroxide, use ammonium persulfate as an oxidant; nickel and dimethylglyoxime form a soluble wine-red complex. At the 460 nm wavelength of the spectrophotometer, measure the absorbance and calculate the nickel content.

3.2 Reagents

Unless otherwise specified, only reagents confirmed to be analytically pure and distilled water or deionized water or water of equivalent purity are used in the analysis.

3.2.10.1 Nickel standard solution (1.0 mg/mL). WEIGH 0.5000 g of metallic

nickel ($w_{\text{Ni}} \geq 99.99\%$) and place it in a 250 mL beaker; ADD 20 mL of nitric acid solution (3.2.2) along the wall of the beaker; COVER the watch glass; HEAT it to dissolve; REMOVE and cool to room temperature; TRANSFER to a 500 mL volumetric flask; USE water to dilute to the mark and mix well.

3.4.2 Number of determinations

Perform two determinations independently and take the average.

3.4.3 Blank test

WEIGH 0.090 g of pure iron ($w_{\text{Ni}} \leq 0.005\%$); do a blank test along with the test portion.

3.4.4.1 Dissolution of test portion

PLACE the test portion (3.4.1) in a 250 mL polytetrafluoroethylene beaker; ADD

10 mL of hydrochloric acid (3.2.1), 10 mL of nitric acid (3.2.2); HEAT at low

temperature to almost no reaction; then add 3~5 drops of hydrofluoric acid