

ICS 73.060

YS

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

YS/T 820.2-2012

**Methods for chemical analysis of laterite nickel ores. Part 2:
Determination of nickel content. Dimethylglyoxime
spectrophotometry**

红土镍矿化学分析方法 第2部分：镍量的测定 丁二酮肟分光光度法
(English Translation)

Issued on: November 7, 2012

Implemented on: March 1, 2013

**Issued by: Ministry of Industry and Information Technology of the
People's**

Table of Contents

Foreword	3
1 Scope	5
2 Normative References	5
3 Method Summary	5
4 Reagents	5
5 Instrument	6
6 Specimen	6
7 Analytical Procedures	6
8 Calculation of Analysis Result	8
9 Precision	8
10 Test Report	9

Foreword

This Part was drafted in accordance with the rules provided in GB/T 1.1-2009.

YS/T 820-2012 Methods for Chemical Analysis of Laterite Nickel Ores is divided into 26 parts in total.

- Part 1: Determination of Nickel Content - Flame Atomic Absorption Spectrometry;
- Part 2: Determination of Nickel Content - Dimethylglyoxime Spectrophotometry;
- Part 3: Determination of Total Iron Content - Potassium Dichromate Titration;
- Part 4: Determination of Phosphorus Content - Phosphorus Molybdenum Blue Spectrophotometry;
- Part 5: Determination of Cobalt Content - Flame Atomic Absorption Spectrometry;
- Part 6: Determination of Copper Content - Flame Atomic Absorption Spectrometry;
- Part 7: Determination of Calcium and Magnesium Content - Flame Atomic Absorption Spectrometry;
- Part 8: Determination of Silica Content - Potassium Silicafluoride Titrimetric Method;
- Part 9: Determination of Scandium and Cadmium Contents - Inductively Coupled Plasma Mass Spectrometry;
- Part 10: Determination of Calcium, Cobalt, Copper, Magnesium, Manganese, Nickel,

Phosphate and Zinc Content - Inductively Coupled Plasma Atomic Emission Spectrometry;

---Part 11: Determination of Fluorine and Chlorine Contents - Ion Chromatography;

---Part 12: Determination of Manganese Content - Flame Atomic Absorption Spectrometry;

---Part 13: Determination of Lead Content - Flame Atomic Absorption Spectrometry;

---Part 14: Determination of Zinc Content - Flame Atomic Absorption Spectrometry;

---Part 15: Determination of Cadmium Content - Flame Atomic Absorption Spectrometry;

---Part 16: Determination of Carbon and Sulfur Content - High Frequency Combustion with Infrared Absorption;

---Part 17: Determination of Arsenic, Antimony and Bismuth Contents - Hydride Generation-atomic Fluorescence Spectrometry;

---Part 18: Determination of Mercury Content - Cold Atomic Absorption Spectrometry;

---Part 19: Determination of Aluminum, Chromium, Iron, Magnesium, Manganese, Nickel and Silicon Contents - Energy-dispersive X-ray Fluorescence Spectrometry;

---Part 20: Determination of Aluminum Content- EDTA Titration;

---Part 21: Determination of Chromium Content - The Ammonium-ferrous Sulfate Titration Method;

---Part 22: Determination of Magnesium Content - EDTA Titration;

---Part 23: Determination of Cobalt, Iron, Nickel, Phosphorus, Aluminum Oxide, Calcium Oxide, Chromium Oxide, Magnesium Oxide, Manganese Oxide, Silicon Dioxide and Titanium Dioxide Content - Wavelength Dispersive X-ray Fluorescence Spectrometry;

---Part 24: Determination Hygroscopic Moisture Content - Gravimetric Method;

---Part 25: Determination of Combined Water Content - Gravimetric Method;

---Part 26: Determination of Loss on Ignition - Gravimetric Method.

This Part is Part 2 of YS/T 820-2012.

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

The responsible drafting organizations of this Standard. Beijing General Research Institute of Mining & Metallurgy; Bayuquan Entry-Exit Inspection and Quarantine Bureau of the People's Republic of China; Jinchuan Group Co., Ltd.

1 Scope

This Part of YS/T 820 specifies the method for the determination of nickel content in laterite nickel ores.

This Part is applicable to the determination of nickel content in laterite nickel ores. The determination range is. 0.10% ~ 3.00%.

2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

YS/T 820.24-2012 Methods for Chemical Analysis of Laterite Nickel Ores - Part 24.

Determination Hygroscopic Moisture Content - Gravimetric Method

3 Method Summary

The test portion is digested with hydrochloric acid, nitric acid, hydrofluoric acid and perchloric acid, then, heated and evaporated to near dryness. Use dilute nitric acid to dissolve the salts.

Use potassium sodium tartrate as a masking agent;

4 Reagents

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

4.1

Hydrochloric acid (1.19 g/mL).

4.2

Nitric acid (1.42 g/mL).

4.3

Hydrofluoric acid (1.15 g/mL).

4.9 Dimethylglyoxime solution (10 g/L). weigh and take 1.0 g of dimethylglyoxime and dissolve

it in 100 mL of sodium hydroxide solution (4.7).

4.10 Nickel standard stock solution. weigh and take 0.5000 g of metallic nickel ($w_{Ni} \geq 99.95\%$);

place it in a 250 mL beaker; along the wall of the beaker, add 20 mL of nitric acid (4.5); cover with a watch glass; heat and dissolve it, then, cool to room temperature.

4.11 Nickel standard solution. transfer and take 10.00 mL of nickel standard stock solution

(4.10); place it in a 500 mL volumetric flask. Add 10 mL of nitric acid (4.5); use water to dilute to the scale, then, mix it up. 1 mL of this solution contains 20 g of nickel.

5 Instrument

Spectrophotometer.

6.1 Specimen

The particle size of the specimen shall be less than 160 μ m.

7.1 Test Portion

Weigh and take 0.10 g of specimen, accurate to 0.0001 g.

7.2 Number of Determinations

Independently carry out two determinations and take the average value.

7.3 Blank Test

Carry out a blank test along with the test portion.

7.4.1 Place the test portion (7.1) in a 200 mL polytetrafluoroethylene beaker; use a small amount

of water to wet it; add 15 mL of hydrochloric acid (4.1), 5 mL of nitric acid (4.2), 2 mL of hydrofluoric acid (4.3) and 2 mL of perchloric acid (4.4).

7.4.2 In accordance with Table 1, divide the test solution into a 100 mL volumetric flask. Add 20 mL of potassium sodium tartrate solution (4.6) and mix it up. Then, add 20 mL of sodium hydroxide solution (4.7) and mix it up.

7.4.3 Transfer and take part of the solution (7.4.2) into a suitable cuvette (1 cm or 2 cm). Take

the reagent blank solution prepared with the test portion as a reference; at a wavelength of 460 nm of a spectrophotometer, measure the absorbance of nickel; find out the