

ICS 73.060
CCS D 04

YS

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

YS/T 820.3-2012

**Methods for chemical analysis of laterite nickel ores - Part 3:
Determination of total iron content - Potassium dichromate
titration**

红土镍矿化学分析方法 第3部分：全铁含量的测定 重铬酸钾滴定法
(English Translation)

Issued on: November 7, 2012

Implemented on: March 1, 2013

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

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Foreword

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

YS/T 820-2012 "Methods for chemical analysis of laterite nickel ores" consists of 26 parts.

- 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 the zinc content - Flame atomic absorption spectrometry;
- Methods for chemical analysis of laterite nickel ores -
- Part 3.Determination of total iron content -
- Potassium dichromate titration

1 Scope

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

This Part is applicable to the determination of total iron content in laterite nickel ores. The determination range is 7.00%~55.00%.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

YS/T 820.24-2012, Methods for chemical analysis of laterite nickel ores -
Part 24.Determination hygrosopic moisture content - Gravimetric method

3 Method summary

The test material is melted with sodium peroxide. Use water to leach the cooled melt out. Then use hydrochloric acid to acidize. Most of the iron is reduced by stannous chloride. The remaining iron is reduced by titanium trichloride. Use potassium dichromate solution to oxidize the excess reducing agent. Use sodium diphenylamine sulfonate as indicator. Use potassium dichromate standard titration solution to titrate the reduced amount of iron.

4 Reagents

Unless otherwise stated, only analytically pure reagents and distilled or deionized water or water with equivalent purity are used in the analysis.

5.1 Specimen

The granularity of the specimen shall be less than 160 μm .

5.2 Determination of wet reserved water amount

While analyzing specimen, determine the wet reserved water amount according to YS/T 820.24-2012.

6.1 Test material

Weigh 0.20 g of specimen, to the nearest of 0.0001 g.

6.2 Determination frequency

Carry out the determination twice, independently. Take the mean value.

6.3 Blank test

Carry out the blank test with test material (see 6.4.4 for requirements).

6.4.1 Decomposition of test material

Place the test material (6.1) in a 30mL corundum crucible. Add 2g~3g of sodium

peroxide (4.1). Mix well. Then add 1 g of sodium peroxide (4.1) to cover. Melt in a muffle furnace at 800°C for 8min~10min. Take out and cool for a while. Leach in a 300mL beaker that containing 40mL of water. Add 25 mL of hydrochloric acid (4.2). Heat on an electric furnace to near boiling.

6.4.2 Reduction

Immediately drop stannous chloride solution (4.9), reduced iron (III). Keep stirring the crucible and solution till the solution becomes light yellow. Clean the inner wall of the beaker with small amount of water. Cool with running water to room temperature. Add 15 drops of sodium tungstate solution (4.13) as indicator. Reduce the remaining iron (III) with titanium trichloride solution. Keep stirring till the solution becomes blue.

6.4.3 Titration

While stirring, drop the potassium dichromate solution (4.8) till colorless. Add

8.1 Repeatability

For the measured values of two independent test results obtained under repeatability conditions, within the average range given below, the absolute difference between these two test results does not exceed the repeatability limit (r); if it exceeds the repeatability limit (r), it shall not exceed 5%. The repeatability limit (r) is obtained by linear interpolation according to the data in Table 1.

Table 1 -- Repeatability limit

8.2 Reproducibility

For the measured values of two independent test results obtained under reproducibility conditions, within the average range given below, the absolute difference between these two test results does not exceed the reproducibility limit (R); if it exceeds the reproducibility limit (r), it shall not exceed 5%. The reproducibility limit (R) is obtained by linear interpolation according to the data