

ICS 71.100.10

CCS Q 52

YS

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

YS/T 575.2-2007

**Methods for chemical analysis of bauxite. Part 2: Determination
of silicon dioxide content. Gravimetric-molybdenum blue
photometric method**

铝土矿石化学分析方法 第2部分：二氧化硅含量的测定 重量-钼蓝光度法
(English Translation)

Issued on: November 14, 2007

Implemented on: May 1, 2008

Issued by: National Development and Reform Commission

Table of Contents

Foreword...	3
1 Scope...	6
2 Method principle...	6
3 Reagents...	6
4 Instruments...	7
5 Specimen...	7
6 Analysis steps...	8
7 Calculation of analysis result...	9
8 Precision...	10
9 Quality assurance and control...	10

1 Scope

This Part specifies the determination method of silicon dioxide content in bauxite.

This Part is applicable to the determination of silicon dioxide content in bauxite.

The determination range is $\geq 15\%$.

2 Method principle

The specimen is melted and decomposed by sodium hydroxide. After it is leached by hydrochloric acid, it shall be evaporated till salt is precipitated. Add hydrochloric acid and ammonium chloride. Filter and burn into silica. Then use hydrofluoric acid to treat so as to make silicon volatilized and removed as silicon tetrafluoride. The weight difference before and after hydrofluoric acid treatment shall be the amount of silica in the precipitate. Use molybdenum blue photometric method to determine the amount of residual silica in the filtrate.

The sum of the two shall be the amount of silica in the specimen.

3 Reagents

3.1

Sodium hydroxide.

3.2

Ammonium chloride.

3.3

Ammonia.

3.4

Hydrochloric acid (1+1).

3.5

Hydrochloric acid (1mol/mL).

3.6

Hydrochloric acid (5+95).

3.7

Hydrofluoric acid ($\rho=1.13\text{g/mL}$).

3.8

Sulfuric acid (1+1).

6.1 Test portion

Weigh 0.5g of specimen (5), to the nearest of 0.0001g.

6.2 Determination times

It shall independently conduct two determinations to a same specimen. Take the average value.

6.3 Blank test

Conduct blank test with test portion.

6.4 Determination

6.4.1

Put the test portion (6.1) into a 30mL silver crucible. Add 3g of sodium hydroxide (3.1) to cover. Cover the crucible. Place in a $750^{\circ}\text{C}\pm 10^{\circ}\text{C}$ muffle furnace. Melt 20min (5min for blank melting). Take it out. Rotate the crucible to make the melt adhere to the inner wall of the crucible evenly. Cool.

6.4.2

Use a filter paper to clean the outer wall of the crucible. Put the crucible upright in a 300mL beaker. Carefully add 20mL of near-boiling water.

Immediately cover the watch glass to prevent splash. After the violent reaction stops, use hydrochloric acid (3.4) and water to clean the crucible. Add 20mL of hydrochloric acid (3.9). Stir evenly. Place on a low-temperature heating plate to evaporate to dry (the salt shall be loose). Add 1g of ammonium chloride (3.2) and 15mL of hydrochloric acid (3.9). Use a glass rod to stir to make all salts on the cup wall dissolved in acid. Cover the watch glass. Under a near-boiling state, insulate for 20min. Use hot hydrochloric acid (3.6) to wash the watch glass and the beaker wall till the volume is about 50mL. Immediately stir till the salt is completely dissolved. Use a fast-quantitative filter paper to filter. Use a 250mL volumetric flask to undertake the filtrate. Use hot hydrochloric acid (3.6) to wash first and precipitate to iron-free ions [use potassium thiocyanate solution (3.10) to check]. Continue using warm water to wash till chloride-free ion [use silver nitrate solution (3.11) to check].

6.4.3 Place the precipitation together with the filter paper in the platinum

crucible. Dry carefully. After ashing, put it into a high-temperature furnace. Burn at 980°C for 1h. Take it out. Place on a dryer. Cool to room temperature. Weigh.

Repeat burning till the constant weight (m1). Along with the inner wall of the crucible, add 3~5 drops of water to moisture the precipitation. Add 4 drops of sulfuric acid (3.8) and 5mL of hydrofluoric acid (3.7). Evaporate at low temperature till it has white smoke. Remove it to cool for a while. Then add 5mL of hydrofluoric acid (3.7). Continue heating till all white smokes are out. Put the

.....