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Methods for Chemical Analysis of Aluminum Ores - Part 24: Determination of Carbon Content and Sulfur Content - Infrared Absorption Method

铝土矿石化学分析方法

第 24 部分：碳和硫含量的测定

红外吸收法

Issued on: December 4, 2009 **Implemented on: June 1, 2010**

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

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Foreword

YS/T 575 *Method for Chemical Analysis of Aluminum Ores* is divided into 24 parts:

---Part 1: Determination of Aluminum Oxide Content - EDTA Titrimetric Method;

---Part 2: Determination of Silicon Dioxide Content - Gravimetric-molybdenum Blue Photometric Method;

---Part 3: Determination of Silicon Dioxide Content - Molybdenum Blue Photometric Method;

---Part 4: Determination of Iron Oxide Content - Dichromate Titrimetric Method;

---Part 5: Determination of Iron Oxide Content - Orthophenanthroline Photometric Method;

---Part 6: Determination of Titanium Dioxide Content - Diantipyrylmethane Photometric Method;

---Part 7: Determination of Calcium Oxide Content Flame Atomic Absorption Spectrophotometric Method;

---Part 8: Determination of Magnesium Oxide Content - Flame Atomic Absorption Spectrophotometric Method;

---Part 9: Determination of Potassium Oxide and Sodium Oxide Content - Flame Atomic Absorption Spectrophotometric Method;

---Part 10: Determination of Manganese Oxide Content - Flame Atomic Absorption Spectrophotometric Method;

---Part 11: Determination of Chromium Oxide Content - Flame Atomic Absorption Spectrophotometric Method;

---Part 12: Determination of Vanadium Pentoxide Content - N-Benzoy-N-Phenylhydroxylamine Photometric Method;

---Part 13: Determination of Zinc Content - Flame Atomic Absorption Spectrophotometric Method;

---Part 14: Determination of the Total Content of Rare Earth Oxide Tribromoarsenazo Photometric Method;

---Part 15: Determination of Gallium Oxide Content - Rhodamine B-extraction Photometric Method;

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Methods for Chemical Analysis of Aluminum Ores - Part 24: Determination of Carbon Content and Sulfur Content - Infrared Absorption Method

1 Scope

This Part specifies the determination of carbon and sulfur content in aluminum ores.

This Part is applicable to the determination of carbon and sulfur content in aluminum ores. The range of determination (mass fraction) is: for carbon, 0.02% ~ 10.00%; for sulfur, 0.020% ~ 12.00%.

2 Method Summary

Place the sample in a high-frequency burner; under oxygen-rich conditions, heat and burn it through a high-frequency induction furnace. The carbon and sulfur are respectively oxidized to carbon dioxide and sulfur dioxide. Through excess oxygen, they are loaded into the measuring cell of their respective infrared gas analyzer. Carbon dioxide and sulfur dioxide respectively have extremely strong characteristic absorption bands at 4.262 μm and 7.40 μm. The absorption energy is proportional to its concentration. In accordance with the changes of energy received by the detector, detect the carbon and sulfur content. Other gas components do not interfere with the determination.

3 Reagents and Materials

3.1 Magnesium perchlorate: anhydrous; granular.

3.2 Alkali asbestos: granular.

3.3 Glass wool.

3.4 Tungsten particles: C ≤ 0.0008%, S ≤ 0.0005%; particle size: 0.4 mm ~ 0.8 mm.

3.5 Pure iron: purity is greater than 99.8%; carbon and sulfur contents are smaller than 0.002%; particle size: 0.8 mm ~ 1.68 mm.

3.6 Oxygen: purity is greater than 99.95%.

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6.3 Calibration Test

6.3.1 In 3 ~ 5 porcelain crucibles (4.6), respectively weigh-take 0.2000 g ~ 0.4000 g of corresponding standard samples. Cover 1.8 g of tungsten particles (3.4). Place them on the crucible holder of a high-frequency burner; let in the oxygen stream and burn it. Calibrate the low carbon and low sulfur channels of the instrument.

6.3.2 In 3 ~ 5 porcelain crucibles (4.6), respectively weigh-take 0.2 g of pure iron (3.5). Weigh-take 0.1000 g of benchmark calcium carbonate (3.8); record its mass. Cover 0.2 g of pure iron (3.5) and 1.8 g of tungsten particles (3.4). Place them on the crucible holder of a high-frequency burner; let in the oxygen stream and burn it. Calibrate the high carbon channel of the instrument. Or, suitable standard samples with a high carbon content may also be adopted to calibrate the high carbon channel.

6.3.3 In 3 ~ 5 porcelain crucibles (4.6), respectively weigh-take 0.2 g of pure iron (3.5). Weigh-take 0.1000 g of potassium sulphate (3.9); record its mass. Cover 0,2 g of pure iron (3.5) and 1.8 g of tungsten particles (3.4). Place them on the crucible holder of a high-frequency burner; let in the oxygen stream and burn it. Calibrate the high sulfur channel of the instrument. Or, suitable standard samples with a high sulfur content may also be adopted to calibrate the high sulfur channel.

6.4 Times of Determination

Conduct three parallel determinations; take the average value.

6.5 Specimen

Weigh-take 0.1 g ~ 0.2 g of sample, accurate to 0.0001 g; record it as m.

6.6 Blank Test

Weigh-take 0.400 g of pure iron (3.5), place it in a crucible. Cover 1.8 g of tungsten particles (3.4). Place on the crucible holder of a high-frequency burner; let in the oxygen stream and burn it. Repeat enough times, till a low and relatively consistent reading is obtained. Record at least three readings; calculate and record the average blank value.

6.7 Sample Determination

In accordance with the requirements of the instrument, input the sample No.; place the porcelain crucible on the balance. Add 0.20 g of pure iron (3.5); weigh-take 0.1000 g of sample, accurate to 0.0001 g; record its mass. Cover 0.2 g of pure iron (3.5) and 1.8 g of tungsten particles (3.4). Place on the crucible holder; in accordance with the instrument's instruction, initiate the analysis function and analyze the samples.

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