GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 71.060.50

G 12

GB/T 31194-2014

High purity zinc sulfide for industrial use

高纯工业品硫化锌

Issued on: September 03, 2014 **Implemented on: May 01, 2015**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine;
Standardization Administration of the People's Republic of China.

Table of Contents

High purity zinc sulfide for industrial use

1 Scope

This Standard specifies the requirements, test methods, inspection rules, marking, labeling, packaging, transportation, storage and safety of high purity zinc sulfide for industrial use.

This Standard applies to high purity zinc sulfide for industrial use. This product is mainly used as raw material for luminescent materials, anti-counterfeiting materials, coating materials, window materials, electroluminescent powder, wear-resistant materials, complexing agents, passivating agents, etc.

2 Normative references

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

GB/T 191-2008, Packaging - Pictorial marking for handling of goods

GB/T 6678, General principles for sampling chemical products

GB/T 6682-2008, Water for analytical laboratory use - Specification and test methods

GB/T 8170, Rules of rounding off for numerical values & expression and judgment of limiting values

GB/T 23771-2009, Determination of bulk density for inorganic chemical products

HG/T 3696.1, Inorganic chemicals for industrial use - Preparations of standard and reagent solutions for chemical analysis - Part 1: Preparations of standard volumetric solutions

HG/T 3696.2, Inorganic chemicals for industrial use - Preparations of standard and reagent solutions for chemical analysis - Part 2: Preparations of standard solutions for impurity

HG/T 3696.3, Inorganic chemicals for industrial use - Preparations of standard and reagent solutions for chemical analysis - Part 3: Preparations of reagent solutions

3 Molecular formula and relative molecular mass

Molecular formula: ZnS.

Relative molecular mass: 97.45 (according to the international relative atomic mass in 2011);

4 Requirements

4.1 Appearance: White to off-white or yellow-green powder.

4.2 High purity zinc sulfide for industrial use shall be tested according to the test methods specified in this standard and shall comply with the technical requirements in Table 1.

5 Test methods

Warning: Some of the reagents used in this test method are corrosive, so be careful when handling! If splashed on the skin, rinse with water immediately. In severe cases, seek medical treatment immediately.

5.1 General provisions

The reagents and water used in this Standard, when no other requirements are specified, refer to analytical reagents and grade-3 water specified in GB/T 6682-2008. The standard titration solutions, impurity standard solutions, preparations and products that are used in the test shall be prepared in accordance with the provisions of HG/T 3696.1, HG/T 3696.2, HG/T 3696.3 when no other requirements are specified.

Take the arithmetic mean of the parallel determination results as the determination result; the absolute difference between the two parallel determination results shall not be larger than 0.2%.

5.4 Determination of iron, lead, copper, nickel, manganese and cadmium contents

5.4.1 Method summary

After dissolving the sample, measure the absorbance of each element on a graphite furnace atomic absorption spectrophotometer, and calculate the content of each element using the working curve method.

5.4.2 Reagents

5.4.2.1 Nitric acid solution: 2+98.

5.4.2.2 Nitric acid solution: 1+1, prepared using high-purity reagents.

5.4.2.3 Hydrochloric acid solution: 1+1, prepared using high-purity reagents.

5.4.2.4 Mixed standard solution of iron, lead, copper, nickel, manganese and cadmium: 1 mL of solution contains 0.01 mg/mL each of iron (Fe), lead (Pb), copper (Cu), nickel (Ni), manganese (Mn) and cadmium (Cd). Pipette 1.00 mL of the standard solution of iron (Fe), lead (Pb), copper (Cu), nickel (Ni), manganese (Mn) and cadmium (Cd) prepared according to HG/T 3696.2 into the 100 mL volumetric flasks respectively; add 0.2 mL of nitric acid solution (see 5.4.2.2); use grade-1 water to dilute to the mark; shake well. This solution shall be prepared before use.

5.4.2.5 Mixed standard solution of iron, lead, copper, nickel, manganese and cadmium: 1 mL of solution contains 0.1 μg/mL each of iron (Fe), lead (Pb), copper (Cu), nickel (Ni), manganese (Mn) and cadmium (Cd). Pipette 1.00 mL of the standard solution of iron (Fe), lead (Pb), copper (Cu), nickel (Ni), manganese (Mn) and cadmium (Cd) prepared according to 5.4.2.4 into the 100 mL volumetric flasks; add 0.2 mL of nitric acid solution (see 5.4.2.2); use grade-1 water to dilute to the mark; shake well. This solution shall be prepared before use.

5.4.2.6 Grade-1 water, in accordance with the requirements of GB/T 6682-2008.

5.4.3 Instruments

Graphite furnace atomic absorption spectrophotometer: equipped with iron, lead, copper, nickel, manganese, and cadmium hollow cathode lamps.

5.4.4 Analysis steps

5.4.4.1 Cleaning of instruments

Before cleaning, all instruments shall be decontaminated, rinsed with water, soaked in nitric acid solution (see 5.4.2.1) for 24 hours, rinsed several times with grade-1 water, and dried to prevent dust contamination.

5.4.4.2 Preparation of test solution

Weigh approximately 0.1 g ~ 2 g of sample A (see 5.6.2) according to the content of impurity elements in the sample, accurate to 0.000 2 g; place it in a beaker; add 5 mL of hydrochloric acid solution; cover with a watch glass; heat at low temperature until almost dry; remove. Add water to dissolve the salts; cool and transfer all to a 50 mL (V) volumetric flask; use grade-1 water to dilute to the mark; shake well.

At the same time, perform a blank test. Except for not adding the sample, the types and amounts of other reagents added are exactly the same as those of the test solution and are treated in the same way as the sample.

5.4.4.3 Drawing of the working curve

Take four 50 mL volumetric flasks; add 0.00 mL, 5.00 mL, 10.00 mL, and 15.00 mL of the mixed standard solution (see 5.4.2.5), respectively; add 0.2 mL of nitric acid solution (see 5.4.2.2); use grade-1 water to dilute to the mark; shake well. This standard series solution I is used for the determination of lead and nickel content. The concentrations of lead (Pb) and nickel (Ni) are 0 μg/L, 10 μg/L, 20 μg/L, and 30 μg/L, respectively.

Take four 100 mL volumetric flasks; add 0.00 mL, 5.00 mL, 10.00 mL, and 15.00 mL of the mixed standard solution (see 5.4.2.5), respectively; add 0.2 mL of nitric acid solution (see 5.4.2.2); use grade-1 water to dilute to the mark; shake well. This standard series solution II is used for the determination of iron and copper contents. The concentrations of iron (Fe) and copper (Cu) are 0 μg/L, 5 μg/L, 10 μg/L, and 15 μg/L, respectively.

Take four 100 mL volumetric flasks; add 0.00 mL, 2.50 mL, 5.00 mL, and 10.00 mL of the mixed standard solution (see 5.4.2.5) respectively; add 0.2 mL of nitric acid solution (see 5.4.2.2); use grade-1 water to dilute to the mark; shake well. This standard series solution III is used for the determination of manganese content. The concentrations of manganese (Mn) are 0 μg/L, 2.5 μg/L, 5 μg/L, and 10 μg/L, respectively.

Take four 100 mL volumetric flasks; add 0.00 mL, 0.50 mL, 1.00 mL, and 2.00 mL of the mixed standard solution (see 5.4.2.5) respectively; add 0.2 mL of nitric acid solution (see 5.4.2.2); use grade-1 water to dilute to the mark; shake well. This standard series solution IV is used for the determination of cadmium content. The concentrations of cadmium (Cd) are 0 μg/L, 0.5 μg/L, 1 μg/L, and 2 μg/L, respectively.

On a graphite furnace atomic absorption spectrophotometer, adjust the instrument to the optimal state at the determination wavelength of each impurity element given in Table 2; measure the absorbance of the element to be measured in each standard series

Take the arithmetic mean of the parallel determination results as the determination result; the absolute difference between the two parallel determination results shall not be larger than 0.02%.

5.7 Determination of bulk density

5.7.1 Method summary

A certain amount of sample passes through a conical funnel and falls freely into a cylindrical material tank of known volume. Accurately weigh the mass of the sample filling the material tank, and obtain the bulk density of the sample by calculation.

5.7.2 Instruments and apparatuses

Same as the requirements in Chapter 3 of GB/T 23771-2009.

5.7.3 Analysis steps

Same as the requirements in Chapter 4 of GB/T 23771-2009.

5.7.4 Result calculation

Same as the requirements in Chapter 5 of GB/T 23771-2009.

Take the arithmetic mean of the parallel determination results as the determination result. The absolute difference between the two parallel determination results shall not be greater than 0.02 g/mL.

5.8 Determination of particle size

5.8.1 Instrument

Laser particle size analyzer: equipped with ultrasonic dispersion device.

5.8.2 Analysis steps

Weigh 1.0 g of sample; place it in a 100 mL beaker; add about 40 mL of water. Disperse in an ultrasonic disperser for 3 min ~ 5 min. Adjust the laser particle size analyzer to the optimal operating state of the instrument; measure the particle size (D_{50}) of the sample according to the measurement steps specified by the laser particle size analyzer.

6 Inspection rules

6.1 All indicators and items specified in this standard are ex-factory inspection items and shall be inspected batch by batch.

6.2 High purity zinc sulfide for industrial use of the same grade produced continuously or by the same team using the same materials and under essentially the same production conditions is considered a batch. Each batch of products shall not exceed 1 t.

6.3 Determine the number of sampling units in accordance with the provisions of GB/T 6678. When sampling, insert the sampler obliquely from the top of the packaging bag to 3/4 of the depth of the material layer to take samples. Mix the sample thoroughly; divide it into quarters to not less than 500 g; immediately divide the sample into two clean, dry containers; seal them; affix labels indicating: manufacturer name, product name, grade, batch number, sampling date and name of the sampler. One is used for inspection and the other is kept for reference. The storage period is determined by the manufacturer based on actual conditions.

6.4 If any indicator in the test results does not meet the requirements of this Standard, samples shall be taken from twice the amount of packaging for re-testing. If even one indicator in the re-test results does not meet the requirements of this standard, the entire batch of products shall be deemed unqualified.

6.5 Use the rounded value comparison method specified in GB/T 8170 to determine whether the test results comply with the standard.

7 Marking, labeling

7.1 The packaging of high purity zinc sulfide for industrial use shall be clearly and firmly labeled with the following information: manufacturer name, address, product name, grade, net content, batch number (or production date), shelf life, and number of this standard, as well as the graphics of "keep away from heat" and "keep away from moisture" specified in GB/T 191-2008.

7.2 Each batch of high purity zinc sulfide for industrial use shipped out of the factory shall be accompanied by a quality certificate. The contents shall include: manufacturer name, factory address, product name, grade, net content, batch number (or production date), certification that product quality complies with this Standard and number of this Standard.

8 Packaging, transportation, storage

8.1 High purity zinc sulfide for industrial use shall be packaged in double layers. The inner packaging shall be a double-layer polyethylene plastic film bag. After the air is exhausted during the inner bag packaging, the bag opening shall be tied tightly with vinyl rope, or sealed with an equivalent method. It shall be leak-proof. The outer packaging shall be a composite plastic woven bag or packaging barrel. The outer packaging bag shall be firmly sewn without leaks or jumpers. The packaging barrel shall be completely sealed. The net content of each bag (barrel) shall be 20 kg.

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------