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Sodium hydrosulfide for industrial use

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Sodium hydrosulfide for industrial use

Warning -- According to the provisions of Chapter 6 of GB 12268-2012, this product belongs to the 8th category of corrosive substances, which can react with acidic substances to generate hydrogen sulfide, which is easy to cause suffocation poisoning. Be cautious during the operation. The personnel who use this Standard shall have hands-on experience in formal laboratory work. This Standard does not address all possible security issues. It is the responsibility of the user to take appropriate safety and health measures and to ensure compliance with the conditions which are set by the relevant national regulations.

1 Scope

This Standard specifies the classification, technical requirements, test methods, inspection rules, marking, labeling, packaging, transportation and storage of sodium hydrosulfide for industrial use.

This Standard applies to sodium hydrosulfide for industrial use, which is mainly used in industries such as mineral processing, pesticides, leather making, dyes, organic synthesis and water treatment.

2 Normative references

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

GB 190, Packing symbol of dangerous goods

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

GB/T 3049-2006, Chemical products for industrial use - General method for determination of iron content - 1,10-Phenanthroline spectrophotometric method

GB/T 6678, General principles for sampling chemical products

GB/T 6679, General rules for sampling solid chemical products

GB/T 6680, General rules for sampling liquid chemical products

third end points; subtract the volume that is consumed by the third end point of the first titration; calculate the sodium carbonate content.

6.3.2 Reagents or materials

6.3.2.1 Barium chloride solution: 100 g/L.

6.3.2.2 Neutral formaldehyde solution: 37% ~ 40% aqueous solution; for the reagent formaldehyde solution, use phenolphthalein as the indicator solution, and use sodium hydroxide to adjust to neutral.

6.3.2.3 Hydrochloric acid standard titration solution: c(HCl) ≈ 0.1 mol/L.

6.3.2.4 Alizarin yellow GG-thymol blue mixed indicator solution:

a) Dissolve 0.1 g of alizarin yellow GG in 100 mL of 50% ethanol solution;

b) Dissolve 0.1 g of thymol blue in 100 mL of 50% ethanol solution;

c) Take 30 mL of a) and 20mL of b) and mix well.

6.3.2.5 Phenolphthalein indicator solution (10 g/L).

6.3.2.6 Bromocresol green-methyl red indicator solution.

6.3.3 Instruments and apparatuses

Acidimeter or automatic potentiometric titrator: the accuracy is 0.02 pH unit; it is equipped with calomel electrode and glass electrode or composite electrode.

6.3.4 Test procedure

6.3.4.1 Preparation of test solution

6.3.4.1.1 Preparation of test solution A

Weigh 10 g ~ 12 g of liquid sample or 5 g of solid sample, accurate to 0.000 2 g; place it in a 500 mL volumetric flask which is pre-added with 15 mL of barium chloride solution; use water to dilute to the mark; shake well. Use medium-speed filter paper for dry filtration; discard the initial filtrate; collect the filtrate as test solution A.

6.3.4.1.2 Preparation of test solution B

Weigh 10 g ~ 12 g of liquid sample or 5 g of solid sample, accurate to 0.000 2 g; dissolve it in a 500 mL volumetric flask; add water to dilute to the mark; shake well, as test solution B.

6.3.4.2 Determination

6.3.5.2 Sodium hydrosulfide content

The sodium hydrosulfide content is calculated, as mass fraction w_2 of sodium hydrosulfide (NaHS), according to Formula (2):

$$w_2 = \frac{(V_2 - 2V_1) \times c \times M/1\ 000}{m \times 25/500} \times 100\% \quad \cdots\cdots(2)$$

Where:

V_2 -- value of the volume of hydrochloric acid standard titration solution that is consumed at the end of the second titration of the test solution that is added with barium chloride, in milliliters (mL);

V_1 -- value of the volume of hydrochloric acid standard titration solution that is consumed at the end of the first titration of the test solution that is added with barium chloride, in milliliters (mL);

c -- exact value of the hydrochloric acid standard titration solution concentration, in moles per liter (mol/L);

M -- value of the molar mass of sodium hydrosulfide, in grams per mole (g/mol) (M = 56.06);

m -- value of the sample (see 6.3.4.1.1) mass, in grams (g).

Take the arithmetic mean of the two parallel determination results as the final result; the difference between the absolute values of the two parallel determination results shall not exceed 0.2%.

6.3.5.3 Sodium carbonate content

The sodium carbonate content is calculated, as mass fraction w_3 of sodium carbonate (Na_2CO_3), according to Formula (3):

$$w_3 = \left(\frac{V_3' - V_2'}{m_1} - \frac{V_3 - V_2}{m}\right) \times \left(\frac{500}{25 \times 1\ 000}\right) \times c \times M \times 100\% \quad \cdots\cdots(3)$$

Where:

V_3' -- volume of hydrochloric acid standard titrant that is consumed at the end of the third titration of the test solution without barium chloride, in milliliters (mL);

V_2' -- volume of hydrochloric acid standard titrant that is consumed at the end of the second titration of the test solution without barium chloride, in milliliters (mL);

6.4.2.7 Starch indicator solution (10 g/L).

6.4.3 Instruments and apparatuses

Micro burette: 10 mL, division value of 0.05 mL.

6.4.4 Test procedure

6.4.4.1 Pipette 200 mL of test solution B; place it in a 500 mL volumetric flask; successively add 60 mL of sodium carbonate solution, 120 mL of zinc sulfate solution, 40 mL of 95% ethanol; add water to dilute to the mark; shake well; dry filter; discard the first 20 mL of filtrate; collect the filtrate in a 500 mL conical flask.

6.4.4.2 Pipette 100 mL of filtrate into a 250 mL conical flask; add 10 mL of glacial acetic acid solution, 2 mL of starch indicator solution; use iodine standard titration solution to titrate until the solution appears blue, as the end point; mark the volume of the consumed iodine standard titration solution as V_4.

6.4.4.3 Pipette another 100 mL of filtrate into another 250 mL conical flask; add 5 mL of formaldehyde solution, 10 mL of glacial acetic acid solution, 2 mL of starch indicator solution; use iodine standard titration solution to titrate until the solution appears blue, as the end point; mark the consumed iodine standard titration solution as V_5.

6.4.5 Test data processing

The sodium sulfite content is calculated, as mass fraction w_4 of sodium sulfite (Na_2SO_3), according to Formula (4):

$$w_4 = \frac{(V_4 - V_5) \times 10^{-3} \times c \times M_1/2}{m_1 \times (200/500) \times (100/500)} \times 100\% \quad \cdots\cdots\cdots\cdots\cdots\cdots (4)$$

Where:

V_4 -- value of the total volume of iodine standard titration solution that is consumed by sodium thiosulfate and sodium sulfite, in milliliters (mL);

V_5 -- value of the volume of iodine standard titration solution that is consumed by sodium thiosulfate, in milliliters (mL);

c -- actual concentration of the iodine standard titration solution, in moles per liter (mol/L);

M_1 -- value of the molar mass of sodium sulfite, in grams per mole (g/mol) (M = 126.0);

m_1 -- value of the sample (see 6.3.4.1.2) mass, in grams (g).

7 Inspection rules

7.1 This Standard adopts type inspection and delivery inspection. Type inspection and delivery inspection shall meet the following requirements:

a) All indicator items which are specified in the requirements of this Standard are type inspection items. Under normal production conditions, type inspection shall be carried out at least once every six months. Type inspection shall be carried out in any of the following situations:

1) when a key production process is updated;

2) when there are changes in the main raw materials;

3) when the suspended production is resumed;

4) when it is significantly different from the previous type inspection;

5) contractual provisions.

b) The sodium hydrosulfide content, sodium sulfide content, and sodium carbonate content indicators which are specified in the requirements of this Standard are delivery inspection items and shall be inspected batch by batch.

7.2 Products which are produced with the same materials and basically the same production conditions continuously or in the same group, by the production enterprise, are the same batch. Each batch of solid products does not exceed 60 t; liquid products are determined according to the size of the storage container.

7.3 Determine the number of sampling units and sampling method in accordance with the provisions of GB/T 6678, GB/T 6679, and GB/T 6680. Mix at least 200 g of liquid or 100 g of solid samples evenly; then, put them in two clean and dry sample bottles or sample bags respectively; label them, marking: manufacturer name, product name, specification, batch number or production date. One is for analysis and inspection; the other is kept for future reference.

7.4 When any indicator of the inspection result does not meet the requirements of this Standard, it shall sample from double the packages for re-inspection; If any indicator the re-inspection result does not meet the requirements of this Standard, the whole batch of products shall be judged as unqualified.

7.5 Use the rounded value comparison method that is specified in GB/T 8170 to determine whether the inspection results meet the standard.

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