GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 71.100.40
G 72

GB/T 5173-2018

Replacing GB/T 5173-1995

Surface active agents - Detergents - Determination of anionic-active matter content - Direct two-phase titration procedure

表面活性剂 洗涤剂 阴离子活性物含量的测定 直接两相滴定法

(ISO 2271:1989, Surface active agents - Detergents - Determination of anionic-active matter by manual or mechanical direct two-phase titration procedure, MOD)

Issued on: December 28, 2018 **Implemented on: July 01, 2019**

Issued by: State Administration for Market Regulation;

Standardization Administration of the PRC.

Table of Contents

Foreword

This Standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GB/T 5173-1995 "Surface active agents and detergents - Determination of anionic-active matter by direct two-phase titration procedure".

Compared with GB/T 5173-1995, the main technical changes of this Standard are as follows:

- ADD the determination of α-sodium alkenyl sulfonate (AOS) (see 7.2);
- Delete the selective use of ethidium bromide (see 4.8.1.3 of the 1995 edition);
- Modify the recommended sampling mass of test portion (see 7.1; 7.1 of the 1995 edition);
- Modify the constant volume of test portion (see 7.2; 7.2 of the 1995 edition);
- Modify the formulas for calculating the anionic-active matter content (see 8.1; 8.1 of the 1995 edition);
- Delete sodium lauryl sulfate (see 4.5 of the 1995 edition);
- Delete the preparation and calibration process of benzethonium chloride and acidic mixed indicator solution; ADD reference standards (see 4.6 and 4.8 of the 1995 edition).

This Standard uses the redraft rules to modify and adopt ISO 2271:1989 "Surface active agents - Detergents - Determination of anionic-active matter by manual or mechanical direct two-phase titration procedure".

Compared with ISO 2271:1989, the structure of this Standard is adjusted as follows:

- Delete the sections on automatic titration instrument of 5.5 and 5.6 of ISO 2271:1989;
- ADD "5.5 Beaker";
- ADD the calculation formula expressed in mmol/g in 8.1;
- Merge 4.2 and 4.3 in ISO 2271:1989 into 4.2 in this Standard. Modify 4.4 in ISO 2271:1989 into 4.3 in this Standard. Delete 4.5 Sodium lauryl sulfate in ISO 2271:1989. Delete preparation and calibration process of 4.6

benzethonium chloride and 4.8 acidic mixed indicator solution; ADD the reference standards. Modify 4.6 in ISO 2271:1989 into 4.5 in this Standard. Modify 4.7 in ISO 2271:1989 into 4.4 in this Standard;

- ADD "e) Test date and test personnel" in Clause 9 "Test report".

There are technical differences between this Standard and ISO 2271:1989. The clauses involved in these differences have been marked by a vertical single line (|) at the blank of the outer margin. Appendix A gives a list of corresponding technical differences and their causes.

This Standard also makes the following editorial changes:

- Modify standard name;

- Delete informative Appendix A;

- Modify precautions for the use of chloroform (see 4.1; 4.1 of the 1995 edition).

This Standard was proposed by China National Light Industry Council.

This Standard shall be under the jurisdiction of National Technical Committee 272 on Surface Active Agents and Washing Supplies of Standardization Administration of China (SAC/TC 272).

Drafting organizations of this Standard: China Research Institute of Daily Chemistry Co., Ltd. [China Washing Supplies Quality Supervision Inspection Center (Taiyuan)], Zanyu Technology Group Co., Ltd., Xi'an Kaimi Co., Ltd., Shanxi Institute of Standardization, Shenzhen Biogmi Biotechnology Co., Ltd.

Main drafters of this Standard: Yao Chenzhi, Xue Wei, Ge Zan, Yu Wen, Duan Pingmei, Zhao Hongmei, Guo Hongtao.

The previous editions of the standard replaced by this Standard were released as follows:

- GB/T 5173-1985, GB/T 5173-1995.

Surface active agents - Detergents - Determination of anionic-active matter content - Direct two-phase titration procedure

1 Scope

This Standard specifies the direct two-phase titration procedure for determination of anionic-active matter content of anionic surface active agents and detergents.

This Standard applies to the analysis of alkyl benzene sulfonate, alkyl sulfonate, alkyl sulfate, alkyl hydroxy sulfate, alkylphenol sulfate, fatty alcohol methoxy and ethoxy sulfate, dialkyl succinate sulfonate and α-sodium alkenyl sulfonate, and solid or liquid products of other anionic-active matters with one hydrophilic group per molecule.

This Standard does not apply to products with cationic surface active agents.

If the analysis result is expressed by mass fraction, the relative molecular mass of the anionic-active matter is known or determined in advance.

Note 1: When the content of low relative molecular mass sulfonate (toluene and xylene sulfonate) in the detergent as a water cosolvent is not higher than 15% of the anionic-active matter, it does not interfere with the analysis results; and when higher than 15%, its influence needs to be considered.

Note 2: Soap, urea, ethylenediaminetetraacetate, and sodium carboxymethylcellulose do not interfere.

Note 3: When non-ionic surface active agents are present, their effects need to be estimated according to special circumstances.

Note 4: Typical inorganic components in detergent formulations, such as sodium chloride, sodium sulfate, sodium borate, sodium tripolyphosphate, sodium perborate, sodium silicate, etc. do not interfere; but bleaches other than sodium perborate are destroyed before analysis and the sample is completely soluble in water.

2 Normative references

The following documents are indispensable for the application of this document.

For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 6682 Water for analytical laboratory use - Specification and test methods (GB/T 6682-2008, ISO 3696:1987, MOD)

GB/T 13173-2008 Surface active agents - Detergents - Testing methods (ISO 607:1980, ISO 2996:1974, ISO 4313:1976, ISO 4325:1990, ISO 697:1981, MOD; ISO 4321:1997, IDT)

QB/T 2739 Preparations of standard volumetric solutions of general test methods for washing products

3 Principle

In a two-phase medium of water and chloroform, in the presence of an acidic mixed indicator solution, use a cationic surface active agent (benzethonium chloride) to titrate, to determine anionic-active matter.

Note: The titration reaction proceeds as follows. Anionic-active matters and cationic dyes form a salt, which is dissolved in chloroform to make the chloroform layer pink. During the titration, all the anionic-active matters in the aqueous solution are reacted with benzethonium chloride. The benzethonium chloride replaces the cationic dye (dimidium bromide) in the anionic-active matter-cationic dye salt. As dimidium bromide is transferred into the water layer, red of chloroform layer fades. A slight excess of benzethonium chloride and an anionic dye (acid blue-1) form a salt, which is dissolved in the chloroform layer to make it blue.

4 Reagents

Unless otherwise specified, the analysis is conducted using the confirmed analytically pure reagents. Water is Grade III water in accordance with GB/T 6682.

4.1 Chloroform.

Note: Dichloromethane may be selected according to the test sample. Before use, confirm that the results of the sample tested by dichloromethane are not significantly different from the results of that tested by chloroform. At the same time, when reporting the results, indicate the type of reagent used.

4.2 Sulfuric acid, c(1/2 H_2SO_4)=0.5 mol/L standard solution, prepared according to QB/T 2739.

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