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NATIONAL STANDARD

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GB/T 9721-2006

Replacing GB/T 9721-1988

Chemical reagent - General rules for the molecular absorption spectrophotometry (ultraviolet and visible)

化学试剂

分子吸收分光光度法通则（紫外和可见光部分）

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

Standardization Administration of the PRC.

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Foreword

This standard replaces GB/T 9721-1988 “Chemical reagent - General rules for the molecular absorption spectrophotometry (ultraviolet and visible)”. As compared with GB/T 9721-1988, the main changes are as follows:

- ADD the references (2 of this version);
- ADD the terms and symbols (3.4, 3.16, and 3.18 of this version);
- MODIFY the relevant contents of the “Instruments” part (6.1, 6.2 and 6.3 of 1988 version; 6 of this version);
- SUPPLEMENT the specification for the technical requirements of the “absorption pool” (7.1.4 of 1988 version; 7.1.4 of this version);
- SUPPLEMENT the application conditions as required by the “absorbance reading range” (7.1.6 of 1988 version; 7.1.6 of this version);
- ADD the “Determination of molar absorptivity” (7.2.4 of this version) and the “Determination of mass absorptivity” (7.2.6 of this version);
- ELIMINATE the “precision” (8 of 1988 version).

This standard was proposed by the Chinese Petroleum and Chemical Industry Association.

This standard shall be under the jurisdiction of the National Chemical Standardization Technical Committee - Chemical Reagent Branch (SAC/TC 63/SC 3).

The drafting organization of this standard: Beijing Chemical Reagent Research Institute.

The main drafters of this standard: Guan Ruibao, Qiang Jinglin.

This standard was first published in 1988.

Chemical reagent - General rules for the molecular absorption spectrophotometry (ultraviolet and visible)

1 Scope

This standard specifies the instrument requirements and determination methods of chemical reagent molecular absorption spectrophotometry (ultraviolet and visible).

This standard applies to the determination of the impurity contents in the chemical reagent of the absorption wavelength between 200 nm ~ 850 nm AND the qualitative and quantitative analysis of the organic chemical reagents, indicators, and special reagents.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard; however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 6682-1992 Water for laboratory use; Specifications (eqv ISO 3696:1987)

GB/T 14666 Terms for analytical chemistry

JJG 178-1996 Visible spectrophotometer

JJG 682-1990 Dual-beam ultraviolet visible spectrophotometer

JJG 689-1990 Ultraviolet, visible, near-infrared spectrophotometer

3 Terms and definitions

The terms and definitions as defined in GB/T 14666 AND the following terms and definitions apply to this standard.

3.1

6 Instruments

In accordance with the sample determination requirements, it shall select the single-wavelength single-beam or single-wavelength dual-beam UV visible spectrophotometer which complies with the requirements of JJG 178-1996, JJG 682-1990 or JJG 689-1990.

7 Determination

7.1 Selection of determination conditions

7.1.1 Light source

SELECT the light source based on the determined wavelength; USE the hydrogen lamp (or tritium lamp) when the determined wavelength is 200 nm ~ 350 nm, AND the tungsten lamp (or iodine tungsten lamp) when the determined wavelength is 350 nm ~ 850 nm.

7.1.2 Slit width

SELECT the appropriate slit width in accordance with the type of substance to be determined AND the detection requirements. Under the conditions of ensuring consistent slit width for the incident light and the transmitted light, ADJUST the slit width. The selection of the slit width shall ensure that the absorbance of the substance to be determined does not increase any more when the slit width is reduced. AND the slit width used for determination is generally 1 nm.

7.1.3 Determined wavelength

In the development of product standards, the determined wavelength is determined in accordance with the position of the substance to be determined, which is generally selected from the wavelength range of the maximum absorbance. If the maximum absorption peak is sharp OR if there is interference from other absorption peak, it may select the other wavelengths from the absorption curve.

7.4.4 Absorption pool

In accordance with the requirements of use, it may, in accordance with the provisions of clause 2.2 “Matching of absorption pool” in JJG 178-1996 OR the provisions of 12 “Specification of standard substance quartz absorption pool” in JJG 682-1990, select the absorption pool; AND it may also use the quartz absorption pool with the GBW 13304 standard substance certificate.

also use the standard sample comparison method to conduct calculation. As for some acid-base indicator, it may use the column chromatography to separate the impurities to determine the absorbance of the main solution; USE the standard control method to calculate the content.

7.2.4 Determination of molar absorptivity

CONDUCT determination in accordance with the specified conditions of the product standards.

The value of molar absorptivity ε is expressed by L / (cm•mol), which is calculated in accordance with the equation (2):

$$\varepsilon = \frac{A}{c \cdot b} \qquad \cdots\cdots(2)$$

Where:

A - The value of the absorbance;

c - The value of the molar concentration of the substance to be determined, in moles per liter (mol/L);

b - The value of the optical path length (i.e., the thickness of the absorption pool), in centimeters (cm).

7.2.5 Sensitivity determination

CONDUCT determination in accordance with the specified conditions of the product standards. Sensitivity can be expressed by the molar absorptivity.

7.2.6 Determination of mass absorptivity

CONDUCT determination in accordance with the specified conditions of the product standards.

Mass absorption coefficient α, the value of L / (cm•g) said, according to formula (3):

The value of mass absorptivityαis expressed by L / (cm•g), which is calculated in accordance with the equation (3):

$$\alpha = \frac{A}{b \cdot \rho} \qquad \cdots\cdots(3)$$

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