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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 23595.2-2025

Replacing GB/T 23595.2-2009

**Test methods of rare earth phosphors for LED - Part 2:
Determination of relative brightness**

LED用稀土荧光粉试验方法 第2部分：相对亮度的测定

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is part 2 of GB/T 23595 Test methods for rare earth phosphors for LEDs. GB/T 23595 has been published for the following part.

- Part 1: Determination of spectrum;
- Part 2: Determination of relative brightness;
- Part 3: Determination of chromaticity coordinates;
- Part 4: Determination of high temperature and high humidity performance;
- Part 5: Determination of pH value;
- Part 6: Determination of electrical conductivity;
- Part 7: Determination of thermal quenching properties;
- Part 8: Determination of high voltage accelerated aging performance.

This document replaces GB/T 23595.2-2009 "Test methods for rare earth yellow phosphors for white light LED lamps Part 2: Relative brightness Compared with GB/T 23595.2-2009, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

a) Added the term and definition of "relative brightness" (see 3.1);

- b) The principle of the method has been changed (see Chapter 4, Chapter 2 of the 2009 edition);
- c) Added the provisions for standard phosphors (see Chapter 5);
- d) The spectroradiometer index has been changed (see 6.1, 4.1 of the 2009 edition);
- e) The sample pan size has been changed (see 6.2, 4.3 of the 2009 edition);
- f) Photoelectric detectors have been modified (see 6.3, 4.4 of the 2009 edition);
- g) Added sample requirements (see Chapter 7);
- h) The precision has been changed (see Chapter 11, Chapter 8 of the 2009 edition).

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document was proposed and coordinated by the National Rare Earth Standardization Technical Committee (SAC/TC229).

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This document was first published in 2009 and this is the first revision.

Introduction

With the continuous development of semiconductor lighting and display technology, higher requirements are placed on the performance of phosphors.

The use of blue LED yellow phosphor has developed into the use of ultraviolet-blue LED blue-green/yellow/yellow-green/red phosphors, as well as blue LED green/red phosphors, including garnet structure aluminate yellow/yellow-green phosphors, nitride red phosphors, silicate LED rare earth phosphor products of mainstream systems such as salt green/yellow phosphor, nitrogen oxide blue-green phosphor, etc. are becoming more and more diverse.

The comprehensive performance requirements of products are getting higher and higher, especially the new requirements for product reliability.

With the upgrading of local phosphor products and technologies, it is necessary to establish a unified evaluation method that conforms to the existing technology.

GB/T 23595 "Test methods for rare earth phosphors for LEDs" consists of 8 parts.

- Part 1: Determination of spectrum;
- Part 2: Determination of relative brightness;
- Part 3: Determination of chromaticity coordinates;
- Part 4: Determination of high temperature and high humidity performance;
- Part 5: Determination of pH value;
- Part 6: Determination of electrical conductivity;
- Part 7: Determination of thermal quenching properties;
- Part 8: Determination of high voltage accelerated aging performance.

In recent years, with the development of semiconductor lighting technology, the number of phosphor systems has gradually increased, and its application areas have continued to expand, including ordinary color rendering, high The color rendering, full spectrum, high-power lighting and general color gamut display market segments have higher requirements for the brightness performance of phosphors.

In terms of detection speed, measurement range, stability and measurement accuracy of phosphor samples, the test range specified in the current national standard is significantly improved.

The range, test accuracy and error cannot meet the actual application requirements. This document uses relative brightness to characterize optical performance and changes the standard applicable The content of the scope of use, instrument equipment, test steps, technical indicators of relative brightness meter and test precision parameters can well meet the needs of the industry.

The rapid analysis and testing requirements for rare earth phosphors for LEDs have improved the accuracy and applicability of product testing, and have helped domestic and foreign LED rare earth phosphors to Production guidance and usage specifications for local phosphor manufacturers and related industries.

Test methods for rare earth phosphors for LED Part 2: Determination of relative brightness

1 Scope

This document describes the method for determining the relative brightness of rare earth phosphors for LEDs excited by ultraviolet to blue light with wavelengths from 350nm to 480nm.

This document is applicable to the determination of relative brightness of rare earth phosphors for LEDs excited by ultraviolet to blue light with a wavelength of 350nm~480nm.

2 Normative references

GB/T 5838.1

GB/T 8170

3 Terms and definitions

The terms and definitions defined in GB/T 5838.1 and the following apply to this document.

3.1 Relative brightness

Br The brightness ratio of a phosphor sample to a standard phosphor under specific excitation conditions.

4 Principles of the method

The quasi-monochromatic light of a specific wavelength is used as the excitation light source. The fluorescence generated by the excited phosphor is collected and then the light is corrected by the visual function.

The electrical detector converts the light signal into an electrical signal. Under the same conditions, the brightness of the standard phosphor is 100, and the relative brightness.

5 Reagents and Materials

Standard phosphor. Relative brightness standard sample of garnet structure aluminate series phosphor for white light LED, No. GSB04-3888- 2021, brand YAG560.

6 Instruments and Equipment

6.1 Spectroradiometer. Use a quasi-monochromatic excitation source with a wavelength between 350nm and 480nm, and the half-peak bandwidth of the excitation spectrum is not greater than