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**Test methods of rare earth long afterglow phosphors -
Part 2: Determination of afterglow brightness**

稀土长余辉荧光粉试验方法 第2部分：余晖亮度的测定

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Test methods of rare earth long afterglow phosphors - Part 2: Determination of afterglow brightness

1 Scope

This Part of GB/T 24981 specifies the determination method of afterglow brightness of rare earth long afterglow phosphors.

This Part applies to the determination of the afterglow brightness of rare earth long afterglow phosphors.

2 Method principle

Use a light source of a color temperature of 5 500 K ~ 6 500 K as the excitation light source; use the specified illuminance to directly illuminate the sample. When the sample is excited and saturated, turn off the excitation light source; use a luminance meter to measure it; record the brightness value of the afterglow fluorescence of the sample at the specified time interval, to get the afterglow brightness of the sample.

3 Terms and definitions

The following terms and definitions are applicable to this document.

3.1

Saturating excitation

The excitation light source is 5 500 K ~ 6 500 K light source (xenon lamp, fluorescent lamp, LED lamp). Extend the excitation time, and the afterglow brightness of the phosphor changes within 5%.

4 Instruments and devices

4.1 Illumination test device

The illumination test device shall meet the following conditions:

- a) The measurement range is 10 lx ~ 1×10^5 lx; the accuracy shall meet the requirements of the national grade-1 illuminometer.

6.1.3 During the measurement process, except for the illumination of the excitation light source within the specified excitation time, stray light interference such as visible light or ultraviolet light is not allowed.

6.2 Illumination correction

Turn on the light source and stabilize for 10 min ~ 30 min according to the requirements of the instrument. Place the photometric probe of the illumination test device on the sample to be excited; adjust the light source; ensure that the average illumination illuminating the tested sample is stable at $1\ 000\text{ lx} \pm 5\text{ lx}$ or $25\text{ lx} \pm 0.5\text{ lx}$.

6.3 Afterglow brightness test

6.3.1 Load the sample into the sample pan; compact and make the surface flat.

6.3.2 Place the sample pan at the place to be excited, so that the sample is irradiated by the light source to reach a saturated excitation state; the excitation illumination on the test surface of the sample shall meet the requirements of 4.1c).

6.3.3 Turn off the light source; immediately use the afterglow brightness test device to test the afterglow brightness of the sample; record the afterglow brightness values of 10 min, 30 min, and 60 min. If the buyer has special requirements, the supplier and the buyer shall negotiate and determine.

6.3.4 Do 3 parallel tests; take the arithmetic average. The relative deviation of the test results shall not exceed 5%.

7 Precision

7.1 Repeatability

For the measured values of the afterglow brightness of two independent tests that are obtained under repeatability conditions, within the average range given below, the absolute difference between these two test results does not exceed the repeatability limit (r); the case of exceeding the repeatability limit (r) is not more than 5%; the repeatability limit (r) is obtained by linear interpolation according to the data in Table 1.

Table 1 – Afterglow brightness and repeatability limits of the long afterglow products

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