

ICS 17.180.99

CCS A 42



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

GB/T 44454-2024

**General test method for absolutely measuring the quantum
efficiency of photoluminescent phosphors**

荧光材料光致发光量子效率绝对测量通用检测方法

Issued on: September 29, 2024

Implemented on: January 1, 2025

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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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. 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 by the China Machinery Industry Federation. This document was prepared by the National Technical Committee on Optics and Photonics (SAC/TC103) and the National Technical Committee on Nanotechnology Standardization (SAC/TC279) jointly managed. This document was drafted by: Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, Changchun University of Science and Technology, Tianmei Instrument Laboratory Equipment (Shanghai) Co., Ltd., China University of Metrology, and China Ordnance Industry Standardization Institute. The main drafters of this document are. Zhang Ligong, Luo Yongshi, Lu Yan, Ma Yuejia, Zhao Haifeng, Liu Quansheng, Zhang Hairong, Zhang Junjie and Zhu Yi. Photoluminescence quantum efficiency of fluorescent materials Absolute measurement universal detection method

1 Scope

China's national general test method for absolute measurement of the photoluminescence quantum efficiency of phosphors. Quantum efficiency is the ratio of photons emitted to photons absorbed, and for a phosphor it is the number that determines how efficient the light source using it will be. A white LED is a blue chip with a phosphor that converts part of that blue to yellow or to red and green, and every photon the phosphor fails to re-emit is heat rather than light - so the lamp's efficacy depends on the phosphor's quantum efficiency as directly as on the chip's. Measuring it absolutely rather than relative to a reference material requires an integrating sphere and a careful accounting of every photon: those absorbed, those emitted, those that pass through unabsorbed, and those re-absorbed and re-emitted within the sample, which is where most of the error in such measurements comes from.

2. Determination of standard measurement methods Basic methods for repeatability and

reproducibility

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 5838.1-2015 Phosphors Part

GB/T 6379.2-2004 Accuracy (trueness and precision) of measurement methods and results Part

3 Terms and definitions

The terms and definitions defined in GB/T 5838.1-2015 and the following apply to this document.

3.1 When a fluorescent material is excited, the total number of fluorescent photons emitted in all directions of space is proportional to the total number of photons absorbed by the excitation light. ratio. [Source: GB/T 39492-2020, 3.2, modified]

3.2 When a fluorescent material is excited, the ratio of the total number of fluorescent photons emitted in all directions in space to the total number of incident photons of the excitation light. [Source: GB/T 39492-2020, 3.1, modified]

3.3 Sample Chamber cel A general term for containers used to hold samples to be tested, reference samples, etc., suitable for spectral testing, and matched with integrating spheres.

3.4 Reference A white standard powder or colorless solvent with high reflectivity for spectroscopic determination of excitation light.

Note. White standard powder is usually barium sulfate or aluminum oxide powder. For the solution, choose a non-fluorescent solvent that is suitable for dispersing fluorescent materials.

3.5 High reflectivity white board used to measure the excitation light spectrum.

Note. Such as alumina, polytetrafluoroethylene and other standard white boards. [Source: GB/T 39492-2020, 3.5, modified]