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

GBZ 123-2006

**Nanomanufacturing - Material specifications - Luminescent
nanomaterials - Part 1: Blank detail specification**

汽车纱罩生产放射卫生防护标准

(English Translation)

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Foreword

This document is a standard or guiding technical document.

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 1 of GB/Z 123 "Specifications for Nanofabrication Materials. Luminescent Nanomaterials". GB/Z 123 has been published as follows.

Part 2.

---Part 1: Blank Detailed Specifications;

---Part 2: Detailed Specifications for General Lighting and Displays this document is modified to adopt IEC TS62565-4-1:2019 "Specification for Nanofabrication Materials - Part 4-1. Luminescent Nanomaterials".

Detailed specifications.

The technical differences between this document and IEC TS62565-4-1:2019, and the reasons therefor, are as follows.

---Replace IEC 62607-3-1 with the normatively referenced GB/T 37664.1 (see Table 3), and replace IEC 62607 with GB/Z 37664.2.-3-2, to adapt to the requirements of my country's technological development;

---Added abbreviations for FFF, FL, HRTEM, and XPM, corresponding to the main text

content, and reordered alphabetically (see...).

Easy to use;

---The definition of the term "3.1.4 Emission Spectrum" has been changed to facilitate accurate understanding of the term;

---The definitions of the terms "3.1.5 Peak Emission Wavelength", "3.1.6 Emission Wavelength Range", and "3.1.8 Full Half-Band Width" have been changed.

The phrase "[on the emission spectrum]" is added at the beginning to facilitate accurate understanding of the terminology;

---The term "3.1.13 peak absorption" has been changed to "3.1.13 peak absorption wavelength".

---The influencing factors to be considered when selecting measurement methods and procedures in Chapter 4 have been revised to better reflect the actual situation of my country's industries;

---The EDX method has been added to the elemental analysis measurement methods in Table 2 to better reflect the actual application of testing techniques.

The following editorial changes have been made to this document.

---To align with my country's standard series, the standard title has been changed to "Specifications for Nanomaterials - Luminescent Nanomaterials Part 1".

Part. Blank Detailed Specifications;

---Notes have been added to Table 2 to facilitate an accurate understanding of the TGA test method.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the Chinese Academy of Sciences.

This document is under the jurisdiction of the Nanomaterials Subcommittee of the National Technical Committee on Standardization of Nanotechnology (SAC/TC279/SC1).

Introduction

With breakthroughs in LED solid-state light source technology, backlight devices that combine white backlights and color filters can produce Solid-state light sources generate the three primary colors of red, green, and blue, significantly improving the color gamut of liquid crystal display devices. Solid-state light sources offer significant technological advantages, such as high energy efficiency.

With its long lifespan, high luminous efficiency, flexible and adjustable emission color, and

high color rendering index, it is increasingly widely used in the display and lighting industries, especially in this has greatly promoted the application of portable electronic devices that use batteries as a power source.

A typical structure for solid-state light sources used in conventional lighting and displays consists of a blue LED and one or more light-emitting materials, according to...

The types of luminescent materials and their emission wavelengths. Solid-state light sources can provide one or more emission bands; therefore, the light emitted by solid-state light sources is blue light.

The light emitted by LEDs and luminescent materials is a mixture of light and light. Luminescent nanomaterials include semiconductor nanocrystals (such as quantum dots and quantum rods) and...

Inorganic nanoparticles. Typical semiconductor nanocrystals are less than 10 nm in size, exhibiting quantum size effects and unique optical properties.

Properties (such as size-related band gaps and the resulting size-related band edge absorption peak wavelengths, emission wavelengths, and emission colors), electrochemical properties.

Characteristics (such as size-related valence and conduction band energy levels and the resulting carrier redox potentials). Sudden changes in semiconductor nanocrystals.

Its advantages are reflected in its broadband absorption (absorbing all wavelengths below the band-edge absorption peak), narrowband emission (usually with symmetrical peak shape), and high luminescence.

Quantum efficiency and excellent photostability. Inorganic nanophosphors with sizes less than 100 nm, such as cerium-doped yttrium aluminum garnet (YAG:Ce) materials.

The material is characterized by a wide range of absorption and emission wavelengths, high luminescence quantum efficiency, and high photostability, but its luminescence characteristics do not correspond to its size.

The relationship is that the positions of the absorption and emission spectra are independent of size, but the specific surface area of inorganic nanoparticles increases as the particle size decreases.

Adding light will cause photoquenching at defects on the particle surface, resulting in size-dependent changes in luminescence quantum efficiency and light decay behavior. Other nano Nanomaterials such as dye-doped or labeled polymer nanoparticles, inorganic particles, or organic-inorganic hybrid nanoparticles are generally not used for lighting or display purposes.

Therefore, it is not included in the scope of this document.

Luminescent nanomaterials for conventional lighting and displays can be selected based on their excitation spectrum, emission spectrum (emission peak wavelength and full width at half maximum), quantum efficiency, They are classified according to their chemical composition, etc. Because luminescent nanomaterials possess excellent luminescent properties, they are used in lighting and display devices.

It also has excellent luminous effect and superb color quality.

GB/Z 123 "Specifications for Nanomaterials in Nanofabrication" is a series of material specifications formulated for luminescent nanomaterial products.

The standard will be established to ensure reliable mass production and quality control of the corresponding luminescent nanomaterial products. It is planned to consist of five parts.

---Part 1: Blank Detailed Specification. This aims to define general technical parameters and testing methods for luminescent nanomaterial products.

---Part 2: Detailed Specifications for Conventional Lighting and Displays. This section aims to specify luminescent nanomaterials for use in conventional lighting and display products.

Technical parameters, indicators, and testing methods.

---Part 3: Detailed Specifications for Quantum Dot Light Conversion Films. This section aims to specify the general technical parameters and specifications for quantum dot light conversion film products.

Test method.

---Part 4: Blank Detailed Specification for Quantum Dot Light Emitting Diodes. This section aims to specify the general technical parameters for quantum dot light-emitting diode products.

Number and testing methods.

---Part 5: Blank Detailed Specification for Quantum Dot Optical Diffusion Plates. This section aims to specify the general technical parameters for quantum dot optical diffusion plate products.

Number and testing methods.

Nanomaterials manufacturing specifications for luminescent nanomaterials Part 1: Detailed Specifications for Blank Spaces

1 Scope

This document specifies the requirements for the necessary optical properties and certain other properties of monodisperse luminescent nanomaterials. This document does not explicitly specify...