ICS 31.030
CCS L 90

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 37946.1-2025

Test methods for organic luminescence material - Part 1: Optical tests

有机发光材料测试方法 第1部分：光学测试

Issued on: October 31, 2025 **Implemented on: May 1, 2026**

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

Table of Contents

Foreword

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/T 37946, "Test Methods for Organic Luminescent Materials". GB/T 37946 has already published the following parts.

1.Optical Testing;

2.Thermal Properties;

4.Electrical properties. 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 and is under the jurisdiction of the National Technical Committee on Standardization of Semiconductor Equipment and Materials (SAC/TC203). This document was drafted by: Jilin OLED Optoelectronic Materials Co., Ltd., China Electronics Technology Standardization Institute, and Guangdong Agreya. Optoelectronic Materials Co., Ltd., Beijing Dingcai Technology Co., Ltd., Sichuan Agre New Materials Co., Ltd., TCL Huaxing Optoelectronic Technology Co., Ltd. The company, Hefei Dingcai Technology Co., Ltd., Beijing Yunji Technology Co., Ltd., Shaanxi Light Optoelectronic Materials Co., Ltd., Nanjing High Opto Semiconductor Materials Co., Ltd., Weisipu New Materials (Suzhou) Co., Ltd., Ningbo Lumilan New Materials Co., Ltd., Dongguan Depu Electric Subsidiary Limited Company. The main drafters of this document are. Sun Feng, Wu Yiran, Ma Xiaoyu, Pan Tonghen, Zhao Junsha, Li He, Jia Xiaoqin, Zhao He, Zhang Ying, Cao Kewei, and Zhang Siming. Feng Yanli, Wang Tie, Shi Zeyuan, Wang Zhipeng, Gao Yaoxiang, Dai Lei, Liu Riming, Jin Wei, Feng Zhen, Zhang Yan, Qian Chao, Hang Deyu, Chen Hua, Zhang Baoshuai, Xu Xuanzong, Dong Shoucheng, Wang Congcong, Zhuang Jianhong, Qiu Zejun.

Organic light-emitting diodes (OLEDs) are a type of self-emissive display technology. Their core principle is that an organic material layer emits light directly when electricity is applied. It boasts numerous advantages, including ultra-thinness, ultra-wide viewing angle, flexibility,

high color gamut, and transparency. Organic light-emitting electron/hole functional materials are organic material layers. One of the core components, it plays a key role in organic light-emitting displays. Purity (content of main substance, content of metallic elements, halogen content), melting point, glass transition temperature, thermal stability, ultraviolet-visible absorption light Spectroscopy, fluorescence spectrum, phosphorescence spectrum, and the refractive index and extinction coefficient, chromaticity, brightness, luminous efficiency, and luminance of the prepared organic light-emitting diodes. Aging is a crucial indicator for organic light-emitting materials, and these indicators are essential for production process control and product quality improvement. Therefore, it is necessary to accurately determine... Establish a testing method for organic light-emitting materials. GB/T 37946 aims to provide test methods for various properties of organic light-emitting materials, and is proposed to consist of four parts.

1.Optical Testing. The purpose is to provide methods for testing the optics of organic light-emitting materials.

2.Thermal Properties. The aim is to provide methods for testing the thermal properties of organic light-emitting materials.

3.Purity. The purpose is to provide a method for testing the purity of organic light-emitting materials.

4.Electrical Properties. The aim is to provide methods for testing the electrical properties of organic light-emitting materials. Test methods for organic light-emitting materials Part

1 Scope

GB/T 37946.1-2025 is the Chinese national standard covering measuring an OLED material's optical behaviour - the absorption and emission spectra, the photoluminescence quantum yield, the lifetime of the excited state, and the film thickness and refractive index, on the materials every OLED display is built from. Part 1 of the series, first edition. In force from 1 May 2026. Issued on 31 October 2025, it has been in force since 1 May 2026.

This document describes methods for testing the optical properties of organic light-emitting materials, including fluorescence, phosphorescence, and ultraviolet light spectra, obtained through solution or thin-film methods. The external-visible absorption spectrum was used for testing; the refractive index and extinction coefficient of the material were tested non-contactly using thin film samples; and organic light was used for testing. The electroluminescence characteristics of photodiode display devices are tested, including color coordinates, brightness, luminous efficiency, and brightness aging. performance. This document applies to the research, development, production, application verification, testing, and inspection of various organic light-emitting materials.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 20871.12 Organic light-emitting diode display devices - Part 1-

3 Terms and Definitions

The terms and definitions defined in GB/T 36919 and GB/T 20871.12, as well as the following terms and definitions, apply to this document.

3.1 single-excited state When a molecule absorbs energy and triggers an electronic transition, if the spin directions of all electrons remain paired (total spin quantum number S=0), then a molecule is formed. The excited state formed.

Note. This state has the characteristic of spin multiplicity 2S 1=1, and together with the triplet state, it constitutes the two basic spin states of molecular excited states.

3.2 Triple excited state When a molecule absorbs energy and triggers an electronic transition, if a spin flip occurs during the excitation process, resulting in a total spin quantum number S=1, its spin multiplicity... The density is 2S 1=3, at which point the excited state is formed.

Note. Based on energy levels, triplet states are labeled T1, T2, and T3, where T1 represents the lowest-energy first excited triplet state. Compared to singlet states, triplet states... The state has a longer lifetime and higher chemical reactivity due to the presence of unpaired electrons.

4 General Requirements

Unless otherwise specified, the test shall be conducted in the following environment.

---Ambient temperature. 15°C~30°C.