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

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**Optics and photonics - Optical materials and components -
Characterization of optical materials used in the infrared
spectral range from 0.78 μm to 25 μm**

光学和光子学 光学材料和元件 0.78 μm ~25 μm 红外光谱用光学材料特性
(English Translation)

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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 modified to adopt ISO 11382:2022 "Optics and photonics optical materials and components for infrared spectra in the range of 0.78 μm to 25 μm " "Properties of Optical Materials".

This document has the following structural adjustments compared to ISO 11382:2022.

---6.2.1.1 and 6.2.1.2 correspond to 6.2.1 and 6.2.2 of ISO 11382:2022 respectively;

---6.4.4 corresponds to 6.4.3 of ISO 11382:2022;

---7.2.1 and 7.2.2 correspond to 7.2 and 7.3 of ISO 11382:2022 respectively;

---7.3 corresponds to 7.4 of ISO 11382:2022;

---7.5 corresponds to 7.5 and 7.6 of ISO 11382:2022.

This document has many technical differences compared to ISO 11382:2022.

A single line (|) is used to indicate these technical differences. A list of these technical differences and their reasons is given in Appendix A.

The following editorial changes were made to this document.

- The content of "scope" has been re-described (see Chapter 1);
- In "Terms and Definitions", replace "regular transmittance" with "spectral transmittance" and replace "regular reflectivity" with "reflectivity" (see Chapter 3);
- Change the symbol of "absorption rate" from α to K in "Symbol" to avoid confusion with the expansion coefficient α ; change the change in refractive index dn to Δn to make it more consistent with the domestic expression; to change the reflectivity ρ to R to avoid confusion with the density ρ ; to change the photoelastic coefficient the symbol of the number K was changed to B to avoid confusion with the absorption rate;
- Delete the "see 5.2, see 5.3, see 5.4, see 5.5" in brackets (see 5.1);
- Move the meaning of the letters in formula (1) to formula (3) " $\Delta m = R_{dm} \tau_{dm}$ " forward to become formula (4) (see 6.1), and other the formula number is postponed;
- Convert "50K or 77K" to "-223.15°C or -196.15°C" (see 6.2.1.2);
- Transform the formula $\tau = e^{-Kd}$ into $K = -\ln \tau / d$, and added the index number description (see 6.3.1);
- Added the reference number description for the refractive index, wavelength λ and extinction coefficient formula (see 6.5.1).

Introduction

Infrared technology has a wide range of applications in automotive night vision, environmental monitoring, high temperature measurement, satellite space detection, medical diagnosis and mineral exploration.

The application of infrared optical materials shows the broad development prospects, and the current application demand is showing a clear growth trend.

Different types of infrared optical materials have different requirements for performance parameters due to their different uses. This document is in ISO 11382.

2022, the performance parameters, test specifications and test methods have been supplemented and improved, and the wording and Description. The technical contents of this document, such as the performance parameters, terminology, symbol identification, and graphic methods of infrared optical materials, are consistent with ISO standards.

The alignment provides a unified standard for technical communication in the industry and plays a positive role in promoting the orderly development of the industry.

Optics and Photonics Optical Materials and Components Optics for 0.78 μ m~25 μ m infrared spectrum Material properties

1 Scope

This document specifies the naming, properties and methods of characterizing optical materials used in the infrared spectral range of 0.78 μm ~25 μm .

The performance parameters of the material are given and the corresponding test methods for these performance parameters are described.

This document is applicable to the characterization and testing of infrared materials used in passive optical components. It can also be used in other spectral bands (such as microwaves, visible light) or UV band) characterization and testing.

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 1409 Measurement of the permittivity and dielectric loss factor of electrical insulating materials at power frequency, audio frequency, and high frequency (including meter wave wavelength) Recommended method (GB/T 1409-2006, IEC 60250:1969, MOD) GB/T 7962.6 Test methods for colorless optical glass Part 6: Young's modulus, shear modulus and Poisson's ratio GB/T 7962.14 Test methods for colorless optical glass Part 14: Acid resistance stability GB/T 7962.15 Test methods for colorless optical glass Part 15: Moisture resistance stability GB/T 7962.16 Test methods for colorless optical glass Part 16: Linear expansion coefficient, transition temperature and relaxation temperature GB/T 7962.20 Test methods for colorless optical glass Part 20: Density GB/T 7962.21 Test methods for colorless optical glass Part 21: Alkali resistance stability (GB/T 7962.21-2019, ISO 10629:1996,MOD)

GB/T 7962.22 Test methods for colorless optical glass Part 22: Phosphoric acid resistance (GB/T 7962.22-2019, ISO 9689:1990, MOD) GB/T 28195 Test method for softening point of glass (GB/T 28195-2011, ISO 7884-6:1987, MOD) GB/T 34184 Test method for infrared refractive index of infrared optical glass - Deflection angle method GB/T 42657 Test method for infrared refractive index temperature coefficient of infrared optical glass - vertical incidence method ISO 9385:1990 Glass and glass-ceramics-Knoop hardness test stress-opticalcoefficient-Part 2: Bendingtest) ISO 12123:2018 Optics and photonics - Specification of optical glass materials ISO 15368 Optics and photonics - Measurement of reflectance of planes and transmittance of plane-parallel components ISO 19740:2018 Optics and photonics - Optical materials and components - Test methods for uniformity of infrared optical materials