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Optics and photonics — Optical materials and components — Test method for refractive index of infrared optical materials

Optique et photonique — Matériaux et composants optiques — Méthode d'essai de l'indice de réfraction des matériaux optiques infrarouges

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 3, *Optical materials and components*.

This second edition cancels and replaces the first edition (ISO 17328:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

— clarification of the description of the device;

— addition of contents to the test report.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document applies to the measurement of relative refractive index to the air for infrared optical materials.

Two categories of major methods for measuring the refractive index of infrared materials exist. These are interferometric methods and minimum deviation methods. In this document, a test method using minimum deviation for infrared materials is described. The same method is applicable to materials used in the visible spectral range, either. It has the advantages of being applicable to more kinds of materials compared with interferometric methods and of ease of data processing because of the simple measurement principle.

Although the refractive index is temperature-dependent, this document describes a measurement method at a stable temperature (ambient air temperature).

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Optics and photonics — Optical materials and components — Test method for refractive index of infrared optical materials

1 Scope

This document provides a standard method for measuring the relative refractive index to the air of infrared materials used in the infrared spectral range from 0,78 µm to 25 µm.

This document excludes methods for measuring the refractive index of birefringent materials and methods for measuring the complex refractive index.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11382:2010, *Optics and photonics — Optical materials and components — Characterization of optical materials used in the infrared spectral range from 0,78 µm to 25 µm*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
refractive index
n
ratio of the velocity of the electromagnetic waves at a specific wavelength in a vacuum to the velocity of the waves in the medium

[SOURCE: ISO 12123:2018, 3.1]

3.2
relative refractive index
ratio of the *refractive index* (3.1) of the material of the specimen to the *refractive index* (3.1) of the material in contact with the specimen at a specific wavelength

3.3
angle of minimum deviation
δ
angle between the ray incident upon the specimen prism and the ray exiting the specimen prism at its minimum value, which occurs when the ray inside the specimen prism makes equal angles with the entrance and the exit faces of the specimen prism

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