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Fine ceramics (advanced ceramics, advanced technical ceramics) — Measurement method of spectral reflectance of fine ceramic thin films under humid conditions

Céramiques techniques — Méthode de mesurage de la transmittance spectrale des films minces de céramiques fines en conditions humides

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Foreword

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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 206, *Fine ceramics*.

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.

Introduction

Fine ceramic thin films are used in many optical applications, such as anti-reflective coatings, infrared sensor cut filters, X-ray sensor cut filters and band-pass filters. Even though the spectral reflectance of fine ceramic thin films is specified for each product, the refractive index and the optical properties change if these thin films are exposed to a humid environment. The reason for such changes in the optical properties is that water is adsorbed onto the surfaces inside the voids of fine ceramic thin films. A standard for evaluating the reliability of these films under a range of humidity conditions is therefore necessary. A standard for determining the spectral transmittance under humid and dry conditions was developed in ISO 17861. This document provides test methods that enable changes in the spectral reflectance of fine ceramic coatings in a humid environment due to water adsorption to be evaluated easily and accurately. The aim of this document is to promote the rapid adoption of this test method to facilitate further growth in this industry.

Fine ceramics (advanced ceramics, advanced technical ceramics) — Measurement method of spectral reflectance of fine ceramic thin films under humid conditions

1 Scope

This document specifies the procedure for measuring the spectral reflectance of fine ceramic thin films in an environment with variable relative humidity by using a general-purpose spectrophotometer.

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 8980-3, *Ophthalmic optics — Uncut finished spectacle lenses — Part 3: Transmittance specifications and test methods*

ISO 9211, *Optics and photonics — Optical coatings*

ISO 17861, *Fine ceramics (advanced ceramics, advanced technical ceramics) — Measurement method of spectral transmittance of fine ceramics thin films under humid condition*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8980-3, ISO 9211 and ISO 17861 and the following 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 http://www.electropedia.org/

3.1
half of maximum/minimum reflectance wavelength
$\lambda_{R1/2}$
wavelength at which the reflectance is equal to half of the maximum and minimum values observed in a spectral reflectance curve obtained for a certain range of wavelength

3.2
environmental mini-chamber
small chamber that is used to control humidity

Note 1 to entry: This chamber is equipped with a quartz window for the optical beam inlet and outlet, an evacuation feedthrough to evacuate the mini-chamber and an inlet to feed air with a controlled humidity to the mini-chamber.

3.3
spectral reflectance
regularly reflected or spectral component of the illumination (i.e. light that is reflected in a mirror-like way off a surface at the same angle and in the same plane as the incident ray) that is measured by using a spectral reflectometer