# INTERNATIONAL STANDARD

# ISO 22197-2

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Fine ceramics (advanced ceramics, advanced technical ceramics) — Test method for air-purification performance of semiconducting photocatalytic materials —

# Part 2: **Removal of acetaldehyde**

Céramiques techniques — Méthodes d'essai relatives à la performance des matériaux photocatalytiques semi-conducteurs pour la purification de l'air —

Partie 2: Élimination de l'acétaldéhyde



Reference number ISO 22197-2:2011(E)

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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 Maison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

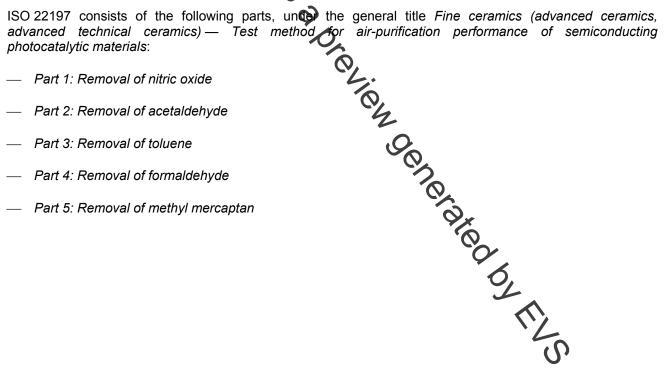
International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical convertees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires apply by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 22197-2 was prepared by Technical Committee ISO/TC 206, Fine ceramics.

ISO 22197 consists of the following parts, unto the general title Fine ceramics (advanced ceramics,



# Fine ceramics (advanced ceramics, advanced technical ceramics) — Test method for air-purification performance of semiconducting photocatalytic materials —



This part of ISO 22197 specifies a test method for the determination of the air-purification performance of materials that contain a photocatalyst or have photocatalytic films, usually made from semiconducting metal oxides, such as titanium dioxide or other ceramic materials, by continuous exposure of a test piece to the model air pollutant under illumination with ultraviolet light (UV-A). This part of ISO 22197 is intended for use with different kinds of materials, such as construction materials in flat sheet, board or plate shape, that are the basic forms of materials for various applications. This part of ISO 22197 also applies to structured filter materials including honeycomb-form, woven and non-woven fabrics, and to plastic or paper materials if they contain ceramic microcrystals and composites. This part of ISO 22197 does not apply to powder or granular photocatalytic materials.

This test method is usually applicable to photocatalytic materials produced for air purification. This method is not suitable for the determination of other performance attributes of photocatalytic materials, i.e. decomposition of water contaminants, self-cleaning antifogging and antibacterial actions. It concerns the removal of acetaldehyde.

#### 2 Normative references

The following referenced documents are indispensable for the opplication 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 80000-1:2009, Quantities and units — Part 1: General

ISO 2718:1974, Standard layout for a method of chemical analysis by gas chromatography

ISO 4224:2000, Ambient air — Determination of carbon monoxide — Non-dispersive infrared spectrometric method

ISO 4677-1:1985, Atmospheres for conditioning and testing — Determination of relative humidity — Part 1: Aspirated psychrometer method

ISO 5725-2:1994, Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method

ISO 6145-7:2001, Gas analysis — Preparation of calibration gas mixtures using dynamic volumetric methods — Part 7: Thermal mass-flow controllers

ISO 10677:—<sup>1)</sup>, Fine ceramics (advanced ceramics, advanced technical ceramics) — Ultraviolet light source for testing semiconducting photocatalytic materials

ISO 16000-3:2001, Indoor air — Part 3: Determination of formaldehyde and other carbonyl compounds — Active sampling method

ISO/IEC 17025:2005, General requirements for the competence of testing and calibration laboratories

ISO 22197-1:2007, Fine ceramics (advanced ceramics, advanced technical ceramics) — Test method for air-purification performance of semiconducting photocatalytic materials — Part 1: Removal of nitric oxide

## 3 Terms and definitions

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

#### 3.1

#### photocatalyst

substance that performs one or more functions based on oxidization and reduction reactions under photoirradiation, including decomposition and removal of air and water contaminants, deodorization, and antibacterial, self-cleaning and antifogging actions

#### 3.2

#### photocatalytic materials

materials in which or on which the photocatalyst is added by coating, impregnation, mixing, etc.

NOTE Such photocatalytic materials are intended provarily for use as building and road construction materials to obtain the above-mentioned functions.

#### 3.3

#### zero-calibration gas

air that does not contain pollutants (i.e. in which common pollutants are below 0,01  $\mu$ I/I and carbon dioxide is below 0,1  $\mu$ I/I)

NOTE The zero-calibration gas is prepared from indoor air using a laboratory air-purification system, or supplied as synthetic air in a gas cylinder.

#### 3.4

#### standard gas

diluted gases of known concentrations supplied in cylinders and certified by anaccredited laboratory

#### 3.5

#### test gas

mixture of air and pollutant(s) of known concentration prepared from a standard gas or a zero-calibration gas, to be used for the performance test of a photocatalytic material.

NOTE The flow rate, concentration, etc., are expressed at the standard state (0 °C, 101,3 kPa) and dry-gas basis (exclusion of water vapour).

#### 3.6

#### dark condition

test condition with no light illumination by the light source for testing and room lighting

NOTE Usually the test gas is supplied for comparison with the illuminated reaction.

<sup>1)</sup> To be published.