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

GB/T 44304-2024

**Test method for fracture resistance of fine ceramics at room
temperature - Indentation fracture(IF) method**

精细陶瓷室温断裂阻力试验方法 压痕（IF）法

(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 21618:2019 "Fine ceramics (advanced ceramics, advanced technical ceramics) Room temperature fracture resistance test method Indentation (IF) method".

Compared with ISO 21618:2019, this document has more structural adjustments. The structural number changes between the two documents are shown in the table below.

See Appendix A.

This document has many technical differences compared to ISO 21618:2019.

A list of these technical differences and their reasons is given in Appendix B.

The following editorial changes were made to this document.

--- In order to coordinate with the existing standards, the name of the standard is changed to "Test method for fracture resistance of fine ceramics at room temperature - Indentation (IF) method";

--- Added the note in "Scope" (see Note 1 in Chapter 1);

--- Changed 3.2 in ISO 21618:2019;

--- Changed the index symbol description of Figure 1;

--- Deleted the note in 8.3 of ISO 21618:2019;

--- Deleted references [11~13] in ISO 21618:2019.

1 Scope

This document specifies a test method for determining the fracture resistance of fine ceramics by the indentation method.

This document is applicable to dense single-phase ceramics, whisker and (or) particle reinforced composite ceramic materials. This document is not applicable to continuous fiber reinforced Strong ceramic matrix composite material.

This document is used for materials development, comparison, quality assessment, characterization, and reliability data collection.

The indentation fracture resistance K_I , IFR specified in this document is not equivalent to the surface crack bending beam (SCF) method, single-sided V-notch beam (SEVNB) method.

Fracture toughness determined by the fracture toughness test method and the single edge pre-cracked beam (SEPB) method, such as. K_{Ic} , SCF, K_{Ic} , SEVNB and K_{Ic} , SEPB.

Note 1: K_{Ic} , SCF and K_{Ic} , SEPB are equivalent to K_{Isc} in ISO 18756:2003[4] and K_{Ipb} in ISO 15732:2012[3] respectively and are used to indicate the surface crack bending stress.

Fracture toughness measured by the SCF method and the SEPB method.

Note 2: K_I , IFR is the resistance of the material to the indentation crack growth, which is related to the material's ability to resist crack growth in the local damaged area [5~7].

The measured fracture toughness values (eg, K_{Ic} , SCF, K_{Ic} , SEVNB and K_{Ic} , SEPB) are related to macroscopic and catastrophic fracture with the initiation of long cracks.

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 3505 Product Geometry Specification (GPS) Surface Structure Profile Method Terminology, Definitions and Surface Structure Parameters (GB/T 3505-2009, ISO 4287:1997, IDT) GB/T 4340.2 Metallic materials Vickers hardness test Part 2: Verification and calibration of hardness testers (GB/T 4340.2-2012, ISO 6507-2:2005, MOD) GB/T 4340.3 Metallic materials Vickers hardness test Part 3: Calibration of standard hardness blocks (GB/T 4340.3-2012, ISO 6507-3:2005, MOD) JC/T 2172 Test method for elastic modulus, shear modulus and Poisson's ratio of fine ceramics - Pulse excitation method

3 Terms and definitions

The following terms and definitions apply to this document.

Fracture resistance

The ability of a material to resist crack growth.

KI,IFR

The ability of a material to resist crack growth caused by indentation.