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

GB/T 44547-2024

**Test method for fracture toughness of fine ceramics -
Single-edge V-notch beam(SEVNB) method**

精细陶瓷断裂韧性试验方法 单边V形切口梁 (SEVNB) 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 23146:2012 "Fine ceramics (advanced ceramics, advanced technical ceramics) Fine ceramics fracture toughness test method Method. Single-Edge V-Notched Beam (SEVNB) Method.

Compared with ISO 23146:2012, 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 23146:2012.

A single line (|) is used to indicate these technical differences. 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 toughness of fine ceramics - Single-sided V-notched beam (SEVNB) Act;
- Replaced ISO 18756 with the informative reference GB/T 44537-2024 (see Chapter 4);
- Added article titles (see 5.1 to 5.12);
- Deleted Note 1 and Note 2 of 5.1 and 6.4 in ISO 23146:2012;
- Deleted the statement "e.g. watch oil" in 5.3 of ISO 23146:2012;
- Deleted the notes to 5.6, 5.10 and 6.1 in ISO 23146:2012;
- Deleted Note 2 of 6.2 and 6.5 in ISO 23146:2012;
- Deleted Note 1, Note 4 and Note 5 of 6.3 in ISO 23146:2012;

--- Replaced ASTM E112 with the informative reference ISO 13383-1:2012 and deleted the informative reference EN 623-3 (see

Note to 6.4, Note 1 to 6.5 in ISO 23146:2012);

--- Deleted the statement in Appendix B of ISO 23146:2012 that the SEVNB method is not recommended for Y-TZP;

--- Deleted the footnote in Table B.1 of ISO 23146:2012;

--- Added Appendix A (informative) This document compares the structure number with ISO 23146:2012;

--- Added Appendix B (informative) Technical differences between this document and ISO 23146:2012 and their reasons.

1 Scope

This document describes a test method for the determination of the fracture toughness of fine ceramics using the single-sided V-notched beam (SEVNB) method.

The samples with single-sided V-notch were loaded in four-point bending mode or three-point bending mode until failure.

This document is applicable to the fracture toughness test of single-phase ceramic materials, whisker and (or) particle reinforced composite ceramic materials.

Used for fine ceramic materials where sharp cracks cannot form at the root of the V-shaped cut.

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 1216 Outside Micrometer GB/T 6569 Test method for flexural strength of fine ceramics (GB/T 6569-2006, ISO 14704:2000, MOD) GB/T 16825.1 Inspection and calibration of static uniaxial testing machines for metallic materials Part 1: Tension and/or compression testing machines Inspection and calibration of force measurement systems (GB/T 16825.1-2022, ISO 7500-1:2018, IDT) GB/T 23806 Test method for fracture toughness of fine ceramics Single edge precracked beam (SEPB) method (GB/T 23806-2009, ISO 15732:2003,MOD)

3 Terms and definitions

The terms and definitions defined in GB/T 23806 and the following apply to this document.

Fracture toughness

The ability of a material to resist crack growth.

[Source. GB/T 44537-2024, 3.2] 3.2 KI the magnitude of the elastic stress field in the opening (mode I) crack tip region.

NOTE 1 The stress intensity factor is a function of the applied force, sample size, geometry and crack length.

Note 2: Cracks are classified into opening type (type I) cracks, sliding type (type II) cracks and tearing type (type III) cracks according to their mechanical characteristics. KI represents the opening type (type I) stress.

Intensity factor.

[Source. GB/T 44537-2024, 3.1] 3.3 ikB