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

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Test method for thermal fatigue of fine ceramics substrate

精细陶瓷基片的热疲劳试验方法

(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 17841:2015 "Fine ceramics (advanced ceramics, advanced technical ceramics) Thermal fatigue of fine ceramic substrates "Test Methods".

Compared with ISO 17841:2015, this document has many 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 17841:2015.

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 "Thermal fatigue test method for fine ceramic substrates";

--- Added Appendix A (informative) "Comparison of this document with ISO 17841:2015 structure numbers";

--- Added Appendix B (informative) "Technical differences between this document and ISO 17841:2015 and their causes".

1 Scope

This document specifies the test method for thermal fatigue testing of fine ceramic substrates used in power modules, electronic control units and similar equipment.

Instruments and equipment, samples, test methods, calculation of test results, test reports.

This document is applicable to the thermal fatigue performance testing, evaluation and report preparation of fine ceramic substrates.

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 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 8170 Rules for rounding off values and expression and determination of limit values GB/T 21389 Vernier, dial and digital calipers

3 Terms and definitions

The following terms and definitions apply to this document.

Ceramic substrateceramicsubstrate Circuit substrates formed by connecting metal plates and fine ceramic plates are used in power modules and similar devices.

Note: Fine ceramic plates include silicon nitride, alumina, aluminum nitride and other materials.

Thermal Cycling

Repeatedly cycles between a specific high temperature and a specific low temperature.

Four-point bending strength the maximum stress that the test sample can withstand through a four-point bending test.

[Source. GB/T 17991-2009, 2.3.20, modified] 3.4 the value of the four-point bending strength (σ_{mb}) of the sample after the thermal cycle test is divided by the average four-point bending strength of the sample not subjected to the thermal cycle test (σ_{mb0})(N=0).