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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 38532-2020

Microbeam analysis - Electron backscatter diffraction - Measurement of average grain size

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the translation method equivalent to ISO 13067..2011

set".

The Chinese documents that have a consistent correspondence with the international documents referenced normatively in this standard are as follows.

--- GB/T 21636-2008 Microbeam Analysis Electron Probe Microanalysis (EPMA) Terminology (ISO 23833..2006, IDT)

--- GB/T 27025-2008 General requirements for the competence of testing and calibration laboratories (ISO /IEC 17025..2005, IDT)

--- GB/T 27788-2011 Scanning electron microscope image magnification calibration guidelines for microbeam analysis (ISO 16700..2004, IDT)

--- GB/T 30703-2014 Guidelines for Microbeam Analysis Electron Backscatter Diffraction Orientation Analysis Method (ISO 24173..2009, IDT)

This standard was proposed and managed by the National Microbeam Analysis Standardization Technical Committee (SAC/TC38).

This standard was drafted. Central Research Institute of China Baowu Iron and Steel Group, Shanghai Design Institute of Power Generation Equipment, Chinese Academy of Sciences Shanghai

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Introduction

The grain size and distribution of engineering materials significantly affect its mechanical

and electromagnetic properties, such as material strength, toughness and hardness.

Mechanical properties. The properties of bulk materials and films, even very narrow two-dimensional structures, are affected by grain size. Therefore, for materials

Grain size and distribution measurements require standard methods and uniform terminology. This standard specifies the application of electron backscatter diffraction orientation distribution mapping.

Procedure for setting average grain size.

Microbeam analysis electron backscatter diffraction

Determination of average grain size

1 Scope

This standard specifies the method for measuring the average grain size of polished sections by electron backscatter diffraction (EBSD).

Measurement requirements for position-dependent orientation, poor orientation, and pattern quality factor in body samples [1].

Note 1. It is generally accepted to use the optical microscope to determine the grain size. Compared with this, EBSD has many technical advantages, such as high spatial resolution and

Quantitative description of grain orientation.

Note 2. This method can also be used to measure the grain size of some complex materials (such as dual-phase materials).

Note 3. When analyzing samples with a large degree of deformation, the results need to be handled carefully.

2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this article

Pieces. For undated references, the latest version (including all amendments) applies to this document.

ISO 16700 Microbeam Analysis Scanning Electron Microscope Image Magnification Calibration Principles (Microbeamanalysis-Scanningelec-

tronmicroscopy-Guidelinesforcalibratingimagemagnification)

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

testingandcalibrationlaboratories)

ISO 21748 Guidance for the use of repeatability, reproducibility and correctness assessment in measurement uncertainty assessment (Guidanceforthe

useofrepeatability, reproducibility and truenessestimatesinmeasurementuncertaintyestimation)

ISO 23833 Microbeam Analysis Electron Probe Microanalysis (EPMA) Terminology [Microbeamanalysis-Electronprobe

microanalysis (EPMA) -Vocabulary]

ISO 24173 Guidelines for Microbeam Analysis Electron Backscatter Diffraction Orientation Analysis Methods (Microbeamanalysis-Guidelinesfor

orientationmeasurementusingelectronbackscatterdiffraction)

3 terms and definitions

The terms and definitions defined in ISO 24173 and ISO 23833, as well as the following, apply to this document.

3.1 Terms related to EBSD grain size measurement

3.1.1

Step size

In the process of EBSD image data acquisition, the distance between two adjacent points of an individual EBSD pattern is obtained.

3.1.2

Pixel; pictureelement

Orientation measurement of the smallest area unit in the EBSD orientation map related to the step size, the electron beam staying at the center of the area unit

The result constitutes the basic unit of the EBSD orientation map.