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

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**Microbeam analysis - Method of specimen preparation for
analysis of general powders using WDS and EDS**

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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 of Standardization Documents"

Drafting:

This document is identical to ISO 20720:2018 "Microbeam Analysis Method for Preparation of Powder Samples for Spectroscopic and Energy Dispersive Analysis":

Please note that some content of this document may be patented: The issuing agency of this document assumes no responsibility for identifying patents:

Introduction

Although Electron Probe (EPMA) and Scanning Electron Microscopy (SEM) are widely used in powder analysis, there are some difficulties, especially in

In the case of single particle analysis, such as:

- a) particle agglomeration during sample preparation;
- b) fixation of the specimen, especially when a small amount of fine particles is present for surface analysis or cross-sectional analysis;
- c) Cross-sectional preparation of small particles with a core-shell structure;
- d) In the case that the particle surface is sensitive to electron beam, protect the particle surface from damage by electron beam irradiation;
- e) neutralization of the charge of the sample under electron irradiation to prevent powder splashing or dispersion due to charge repulsion;
- f) When the volume of X-rays generated is larger than the powder particles, the interpretation of qualitative and quantitative analysis results:

In the case of analyzing the elemental composition of powders, sample preparation can also affect the analytical results because of coarseness in particle aggregates or agglomerates

Degree, void space can affect X-ray intensity:

To overcome these difficulties, it is important to standardize sample preparation for particle analysis:

Microbeam Analysis for Spectroscopy and Energy Spectroscopy

Powder sample preparation method

1 Scope

This document specifies the use of an energy dispersive spectrometer (EDS) or spectrometer mounted on an electron probe (EPMA) or scanning electron microscope (SEM):

(WDS) Method of sample preparation when analyzing particles in powders: According to the purpose of analysis and particle size, the preparation method of powder particle samples

classified:

This document applies to inorganic particles with a particle size ranging from 100 nm to 100 μm :

This document is not suitable for some special applications, such as forensic analysis or trace analysis:

2 Normative references

There are no normative references in this document:

3 Terms and Definitions

There are no terms and definitions that need to be defined in this document:

4 Abbreviations

The following abbreviations apply to this document:

EDS: energy spectrometer (energy-dispersiveX-rayspectrometer)

EDX: energy-dispersiveX-rayspectroscopy

Energy-dispersiveX-rayspectrometry

EPMA: Electron Probe Microanalysis

Electron probe microanalyzer (electronprobemicroanalyzer)

SEM: Scanning Electron Microscopy

Scanning Electron Microscope

WDS: Spectrometer (wavelength-dispersiveX-rayspectrometer)

WDX: Wavelength-dispersiveX-rayspectroscopy

Wavelength-dispersiveX-rayspectrometry

5: Sample preparation method

5:1 Overview

Particle analysis mainly adopts the following sample preparation methods (see Figure 1):

The specific steps of the preparation method are shown in 5:2: In some cases, no

The use of other more suitable sample preparation methods for particle analysis is excluded: