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GB/T 47186-2026

**Microbeam analysis - Quantitative analysis of rare earth
minerals by electron probe microanalyzer**

微束分析 稀土矿物的电子探针定量分析方法

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Table of Contents

1.Scope	1
2 Normative References	1
3.Terms and Definitions	1
4.Instruments and Equipment	2
5.Sample Preparation 2 6 standard samples	2
6.1 Principles for Selecting Standard Samples	2
6.2 Rare Earth Element Standards	2
6.3 Test conditions for rare earth element standards	2
7.1 General Rules	3
7.2 Qualitative Analysis Conditions	3
7.3 Peak Identification	3
8.Quantitative Analysis	3
8.1 Overview	3
8.2 Quantitative Analysis Conditions	4
8.3 Interference coefficient correction	5
8.4 Validation of Quantitative Analysis Conditions	5
8.5 Error in analysis results	5
7 References	12

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying these patents. This document was proposed by the National Technical Committee on Standardization of Microbeam Analysis (SAC/TC38). This document was prepared by the National Technical Committee on Standardization of Microbeam Analysis (SAC/TC38) and the National Technical Committee on Standardization of Rare Earth (SAC/TC38). 229) Joint jurisdiction. This document was drafted by: Institute of Mineral Resources, Chinese Academy of Geological Sciences; Baogang Group Mining Research Institute (Limited Liability Company); and Nuclear Industry. Beijing Institute of Geology, Institute of Geology and Geophysics, Chinese

Academy of Sciences, Nanjing University, Institute of Disaster Prevention Science and Technology, Baotou Rare Earth Research Institute, National Standards (Beijing) Inspection and Certification Co., Ltd., China Nonferrous Metals Guilin Mineral Geology Research Institute Co., Ltd., and Jielu (Beijing) Science and Trade Co., Ltd. The main drafters of this document are: Chen Zhenyu, Yu Junfang, Fan Guang, Mao Qian, Zhang Wenlan, Meng Wenxiang, Xu Wentan, Wang Zhenjiang, Ye Sitong, and Wei Zhiwei. Hu Jinsheng and Deng Liumin.

Accurate quantitative analysis of rare earth mineral composition is of great significance for ore deposit genetic research, mineral exploration, and mineral development and utilization. Electron probe microanalysis (EPMA) is an important tool for the analysis of rare earth mineral composition, but quantitative analysis of rare earth minerals is a challenge in EMA. The main reason is... Because individual rare earth elements emit numerous characteristic X-ray systems when excited, and these systems are densely distributed; rare earth elements, due to their atomic... Minerals with similar structures and elemental geochemical properties often contain multiple rare earth elements; the rare earth element series overlap with each other. The phenomenon of superposition interference is very serious. Therefore, in order to obtain reliable and comparable analytical results between electron probe laboratories, it is necessary to prepare... Establish a standard for electron probe microanalysis of rare earth mineral components, specifying the working conditions and analytical procedures. Regulations are made regarding reference materials, etc. Electron probe microanalysis of rare earth minerals Quantitative analysis methods

1 Scope

GB/T 47186-2026 is the Chinese national standard covering quantifying rare earths in a mineral grain with an electron microprobe - a hard measurement because the rare earth X-ray lines overlap each other badly, which is most of what this method exists to handle. First edition, and it belongs with the volume electron microscopy method GB/T 47187-2026 of the same batch. It was issued on 27 February 2026 and has been in force since 1 September 2026, as a first edition. The document is under the responsibility of the Standardization Administration of China. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document describes the selection of standards, the selection of analytical testing conditions, the correction of interference peaks, and the analytical steps for electron probe microanalysis of rare earth mineral composition. Steps, result processing, and test reports. This document applies to electron probe microanalysis of rare earth minerals, and also to electron probe microanalysis of other rare earth compounds.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to this document, only the version corresponding to that date applies. For undated references, the latest version (including all amendments) applies. This document.

GB/T 4930 Technical Specifications for Standard Samples for Electron Probe Microscopy Analysis

GB/T 15074 General Rules for Electron Probe Quantitative Analysis

GB/T 17366 Preparation of Samples for Electron Probe Analysis of Minerals and Rocks

GB/T 20725 Guidelines for Qualitative Point Analysis by Electron Probe Microscopy in Microscopic Analysis

GB/T 21636-2021 Electron Probe Microscopy (EPMA) Terminology

GB/T 43749 Microbeam analysis - Electron probe microscopy - Quantitative analysis method for anhydrous carbonate minerals

GB/T 43889 Guidelines for the Implementation of Quality Assurance Procedures for Electron Probe Micrometers (EPMA)

3 Terms and Definitions

The terms and definitions defined in GB/T 21636-2021, as well as the following terms and definitions, apply to this document.

3.1 rare earth elements The lanthanide elements with atomic numbers from 57 to 71 in the periodic table are lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), promethium (Pm), and samarium. (Sm), europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb), lutetium (Lu), and atoms with atomic number

21 The term REE refers to a group of 17 elements, including scandium (Sc) and yttrium (Y). It is usually represented by the symbol REE and consists of elements with similar chemical properties. Currently... In rare earth industry and product standards, rare earth elements generally refer to 15 elements other than promethium (Pm) and scandium (Sc). [Source: GB/T 15676-2015, 2.2]

3.2 Rare earth minerals Minerals whose structural formulas include rare earth elements.

Note. Such as monazite, xenotime, bastnaesite, bastnaesite, etc.

3.3 Interfering peak A spectral peak synthesized from more than one characteristic X-ray peak. [Source: GB/T 21636-2021, 4.6.9]