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

GB/T 15074-2025

Replacing GB/T 15074-2008

General specification for EPMA quantitative analysis

电子探针定量分析方法通则

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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 replaces GB/T 15074-2008 "General Rules for Electron Probe Quantitative Analysis Methods". In addition to structural adjustments and editorial changes, the main technical changes are as follows:

- a) The scope has been changed (see Chapter 1, Chapter 1 of the.2008 edition);
- b) Added terms and definitions (see Chapter 3);
- c) The statement of the principle of the method has been changed (see Chapter 4, Chapter 3 of the.2008 edition);
- d) The main structure diagram and description of the electron probe have been changed (see 5.1.1, Chapter 4 of the.2008 edition);
- e) Added the requirements for electron probe beam stability (see 5.1.2);
- f) Added recommendations for electronic probe calibration/verification (see 5.1.2);
- g) Changed the requirements for the environmental conditions of the electronic probe (see 5.2, Chapter 5 of the.2008 edition);

- h) The selection principles, requirements and use of standards have been changed (see 5.3, Chapter 8 of the.2008 edition);
- i) The requirements for sample preparation have been changed (see Chapter 6, 12.1 of the.2008 edition);
- j) The preparation before measurement has been changed, the X-ray counting system has been deleted, and the requirement for comprehensive inspection of total error has been added (see Section 7). Chapter 6 of the.2008 edition);
- k) Changed the recommended value of accelerating voltage (see 8.1,

1 Scope

GB/T 15074-2025 is the Chinese national standard on general specification for epma quantitative analysis, in the field of chemical technology. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 28 March 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 October 2025. Classification: ICS 71.040.99, CCS N 53. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document specifies the instrumentation, standard samples, sample preparation, and pre-measurement procedures for quantitative analysis using an electron probe microanalyzer (EPM). Preparation, selection of measurement conditions, measurement process, measurement of electron beam incident current, calculation of mass fraction of each element, and measurement uncertainty Assessment and reporting of results. This document is applicable to the quantitative measurement and data processing of each element in the sample by electron probe, and the quantitative analysis of the scanning electron microscope with a spectrometer. Analysis and reference implementation.

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 4883 Statistical processing and interpretation of data - Determination and processing

of outliers in normal samples

GB/T 4930 Guidelines for the technical conditions of standard samples for microbeam analysis electron probe microanalysis

GB/T 13298 Metal microstructure inspection methods

GB/T 17359 Microbeam analysis of elements with atomic number not less than 11 by energy spectrometry

GB/T 17366 Preparation of samples for electron microprobe analysis of minerals and rocks

GB/T 20725 Guidelines for electron probe microanalysis using spectroscopy and qualitative point analysis

GB/T 21636 Terminology for Electron Probe Microanalysis (EPMA)

GB/T 27025 General requirements for the competence of testing and calibration laboratories JJG901 Electron Probe Analyzer

3 Terms and definitions

The terms and definitions defined in GB/T 21636 apply to this document.

4 Principles of the method

The electron probe quantitative analysis method is a method for quantitative analysis of micro-area components. The sample is bombarded with a concentrated electron beam to stimulate the characteristic X-rays of its constituent elements, and the characteristic X-rays are separated and the intensity is measured by a spectrometer. The characteristic X-ray intensity of the sample is measured and compared with that of the standard sample (hereinafter referred to as the standard sample) under the same conditions. After calibration and calculation, the sample The content of each element in the excited area.

5.1 Electron Probe

5.1.1 The electron probe mainly consists of an electron gun, a lens system, an optical microscope, a sample chamber, a spectrometer, an X-ray measurement system, an image signal detector,