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

GB/T 15244-2013

Replacing GB/T 15244-2002

**Microbeam analysis - Quantitative analysis of silicate glass by
wavelength dispersive and energy dispersive X-ray
spectrometry**

微束分析 硅酸盐玻璃的定量分析 波谱法及能谱法

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Quarantine;
Standardization Administration of the PRC**

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Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules. This standard replaces GB/T 15244-2002 "electron probe quantitative analysis method of Glass" This standard compared with GB/T 15244-2002 main changes as follows:

- To increase the selection principles of the standard sample (see
- Delete 5.3 (K-44) and (K-45);
- Increased requirements after sample preparation (see 6.1);
- Modify the sample and standard samples deposited conductive film specific requirements (see 6.3);
- Modify the quantitative analysis instrument before boot time requirements (see 7.1.1);
- Added "analysis region is large, you can also use a coaxial optical microscope electron microprobe analysis to determine the site" (see 7.14);
- Accelerating voltage selection increases the overvoltage ratio requirements by modifying the atomic number of different accelerating voltage selection method (see 7.2.1);
- Increased silicon drift EDS (SDD) of the beam selection method (see 7.2.2);
- Increasing the electron beam scanning method for analyzing unstable glass (see 7.2.3);
- Atomic number range of options to modify the X-ray line system (see 7.2.4);
- Increased SDD spectrometer measurement conditions (see 7.3.3);
- Increasing the X-ray intensity in the measurement time of less than 1% of the requirements (see 7.3.5);
- Increasing the difference between the measurement of light elements (see 8.2);

1 Scope

China's national method for the quantitative microanalysis of silicate glass by electron probe and scanning electron microscope, using wavelength dispersive and energy

dispersive X-ray spectrometry. It specifies the quantitative analysis of silicate glass by EPMA and SEM with WDS and EDS. Microbeam analysis is what allows a composition to be determined from a volume a few micrometres across, which is the only way to analyse an inclusion, a phase, a diffusion profile or a small particle - and silicate glass is one of the commonest subjects, both as a material in its own right and as the standard reference material against which other silicate analyses are calibrated. It is also one of the more difficult subjects, and that is what the standard is about. Glass under an electron beam is damaged by it: the beam heats a poorly conducting material and the alkali ions - sodium above all, and lithium and potassium after it - migrate away from the analysed spot within seconds, so the sodium count falls while the analysis is being made and the result is systematically low unless the measurement is arranged to prevent it. The standard therefore sets the beam conditions, the current and the spot size that limit the damage, the counting strategy and the order in which the elements are measured, the correction or extrapolation for the alkali loss, the coating of the specimen and its effect, the standards used for calibration and the matrix correction applied. The distinction between the wavelength and the energy dispersive approaches - the first slower and more precise, the second faster and better suited to a survey - is set out so that a laboratory can choose knowingly. Issued on 19 July 2013 and in force since 1 March 2014, it replaces GB/T 15244-2002.

This standard specifies the electron probe analyzer (EPMA) and scanning electron microscopy (SEM) X-ray spectrometer (WDS) and energy dispersive spectroscopy (EDS) for quantitative analysis of silicate glass. This standard applies to silicate glass samples (including alkali metal silicate glass) spectroscopy (WDX) and spectroscopy (EDX) fixed Quantitative analysis.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

GB/T 4930-2008 electron probe microanalysis standard specimen technical conditions Guidelines

GB/T 17359-2012 micro beam analysis Spectroscopy Quantitative Analysis Electron microprobe

GB/T 17366 of mineral and rock specimen preparation

GB/T 28634-2012 micro beam analysis electron probe microanalysis bulk sample spectrum Quantitative point analysis

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Field mobility field-induced migration The internal electric field in the insulator by an electron or ion bombardment caused by the effects of migration of atoms occurs.

3.2 Silicate glass silicate glass Silica glass as a main component. The most commonly used soda lime silicate glass, soda aluminosilicate glass, sodium borosilicate glass, Architectural glass, household glass, most optical glass, glass fibers and the like.

3.3 Ion transport ion migration In the electron beam irradiation, the sample ions of certain elements of the mobile electron beam spot phenomenon.

3.4 Migration components migration composition In the electron beam irradiation, ion transport elements of the sample occurs.

3.5 Dynamic Measurement dynamic measurement X-ray intensity in the measurement sample while the sample method of a mobile station or the electron beam irradiation point.