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

GB/T 34326-2026

Replacing GB/T 34326-2017

**Surface chemical analysis - Depth profiling - Methods for ion
beam alignment and the associated measurement of current or
current density for depth profiling in AES and XPS**

表面化学分析 深度剖析 AES和XPS深度剖析时离子束对准方法及其束流或束流密
度的测量方法

(English Translation)

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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.

This document replaces GB/T 34326-2017 "Surface Chemical Analysis - Depth Profiling. Ion Beam Alignment in AES and XPS Depth Profiling".

The method for measuring beam current or beam density, compared with GB/T 34326-2017, mainly differs in technical aspects, except for structural adjustments and editorial changes.

The changes are as follows.

- a) Added instructions on the automatic program and ion beam parameters used for elliptical aperture FC (see Table 1);
- b) The requirement for alignment using a Faraday cup during oblique incidence of the ion beam has been changed (see 5.3.2, note 5.3.2 in the 2017 edition);
- c) The method for aligning the ion beam when it is incident obliquely on the sample or Faraday cup has been changed (see 5.3.3, note 5.3.3 in the 2017 edition);
- d) The alignment of the ion beam was adjusted using secondary electron or optical microscopy of the sample stage features and the sample to be analyzed.

Method (see 5.5.4, note 5.5.4 in the 2017 edition).

This document is equivalent to ISO 16531:2020 "Surface chemical analysis - Depth profiling - Ion beam alignment during AES and XPS depth profiling".

Methods and methods for measuring beam current or beam density.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed and is under the jurisdiction of the National Technical Committee on Standardization of Surface Chemical Analysis (SAC/TC608).

Introduction

In surface chemical analysis using Auger electron spectroscopy (AES) and X-ray photoelectron spectroscopy (XPS), ion sputtering has been widely used in many fields.

In the surface cleaning of devices and materials and the deep characterization of layered structures, ultrathin films with a thickness of less than 10 nm are increasingly being used in current applications.

With the advent of new-generation devices, low-energy ion depth profiling is becoming increasingly important. For reproducible sputtering rates and good depth resolution, it is crucial to...

Align the ion beam to the optimal position. As depth resolution requirements increase, alignment optimization becomes increasingly important. Typically, an ion beam is not required.

Alignment is necessary, but ion beam alignment is required when instrument parameters change, such as when replacing the ion gun filament or when the instrument is baked. During the alignment process, one...

Take care to avoid splashing or other actions that could affect the analytical sample on the sample holder. The instrument has several different alignment methods. This document describes...

Six methods are provided to ensure that most analysts can use at least one method for alignment. Two of these methods can also be used to measure ion beam current or electrical current.

Flux density is important when measuring sputtering yield and consistency in measuring sputtering rate. For commercial instruments, manufacturers can provide ion beams.

Alignment methods and equipment. The methods described herein may not be necessary if they are provided, but they can help verify the method.

ISO 14606 describes how to measure depth resolution from layered samples and uses it to

monitor whether depth profiling is adequate, properly optimized, or yielding satisfactory results.

To achieve the desired performance. However, this method is time-consuming, from instrument setup to evaluating depth resolution through depth measurements, therefore this document provides...

A faster procedure has been implemented to ensure proper ion beam alignment, as a first step in using ISO 14606 or a more routine check.

In-depth analysis of surface chemical analysis using AES and XPS Ion beam alignment methods and beam current during depth profiling Methods for measuring beam current density

1 Scope

This document describes ion beam pairings using inert gas ions in Auger electron spectroscopy (AES) and X-ray photoelectron spectroscopy (XPS).

Quasi-methods are used to ensure good depth resolution and optimal surface cleanliness in sputtering depth profiling. These methods fall into two categories. one uses Faraday...

One type of method measures the ion beam current using a cup; another type is the imaging method. The Faraday cup method, in particular, specifies the measurement of ion beam current density and distribution.

Require.

This document applies to ion guns with a beam diameter of 1 mm or less, but does not include depth resolution optimization.

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 documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

ISO 18115-1 Vocabulary for Surface Chemical Analysis Part 1: General Terminology and Spectroscopic Terminology (Surfacechemical) Note. GB/T 22461.1-2023 Surface Chemical Analysis Vocabulary Part 1: General Terminology and Spectroscopic Terminology (ISO 18115-1:2013, IDT)

3 Terms, definitions, symbols and abbreviations

The terms and definitions defined in ISO 18115-1, as well as the following symbols and abbreviations, apply to this document.

A. Area of the Faraday cup orifice AR. Grid scan area along the known direction of the ion beam A0. Area scanned by the ion beam grid on the sample surface B. Ion beam broadening parameter, equal to the ratio of louter/linner.

C. Current

CD. Current Density

D'. Ion dose rate on sample F'. Ion flux output from the ion gun FC. Faraday Cup I. Scanning ion beam current measured within the Faraday cup orifice linner. Ion current measured on the inner electrode of the coaxial cup louter. The ion current measured on the external electrode of the coaxial cup IS. Beam current measured in the dark region according to the method specified in 5.5.