

Surface chemical analysis — Guidelines for preparation and mounting of specimens for analysis

ICS 71.040.40

National foreword

This British Standard reproduces verbatim ISO 18116:2005 and implements it as the UK national standard.

The UK participation in its preparation was entrusted to Technical Committee CII/60, Surface chemical analysis, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii to vi, pages 1 to 16, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 7 November 2005

© BSI 7 November 2005

INTERNATIONAL STANDARD

ISO
18116

First edition
2005-08-15

Surface chemical analysis — Guidelines for preparation and mounting of specimens for analysis

*Analyse chimique des surfaces — Lignes directrices pour la préparation
et le montage des échantillons destinés à l'analyse*



Reference number
ISO 18116:2005(E)

AVA **Documents**
Document Sharing Hub

Contents

Page

1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Symbols and abbreviated terms	1
5	General requirements	1
6	Visual inspection of the specimen	2
7	Specimen considerations	2
7.1	History	2
7.2	Information sought	2
7.3	Specimens previously examined by other analytical techniques	2
8	Sources of specimen contamination	3
8.1	Tools, gloves, mounts and similar materials	3
8.2	Exposure to gases	3
8.3	Exposure to instrumental vacuum	3
8.4	Exposure to electrons, ions, and X-rays	3
8.5	Contamination of the analytical chamber	4
9	Specimen storage and transfer	4
9.1	Storage time	4
9.2	Storage containers	4
9.3	Temperature and humidity	4
9.4	Specimen transfer	5
10	Specimen mounting procedures	5
10.1	General procedures	5
10.2	Powders and particles	5
10.3	Wires, fibres and filaments	6
10.4	Pedestal mounting	6
10.5	Reduction of thermal damage during analysis	6
11	Methods for reducing specimen charging	6
11.1	General considerations	6
11.2	Conductive mask, grid, wrap or coating	6
11.3	Flood gun	7
11.4	Electron and ion beams	7
12	Specimen preparation techniques	7
12.1	General considerations	7
12.2	Mechanical separation	7
12.3	Thinning versus removal	8
12.4	Removal of the substrate	8
12.5	Sectioning techniques	8
12.6	Growth of overlayers	9

12.7	Solvents	9
12.8	Chemical etching	10
12.9	Ion sputtering	10
12.10	Plasma etching	11
12.11	Heating	11
12.12	Ultraviolet radiation	11
13	Fracturing, cleaving and scribing	12
13.1	Fracture	12
13.2	Cleaving	12
13.3	Scribing	12
14	Special specimen-handling techniques	13
14.1	Prepumping of gassy specimens	13
14.2	Viscous liquids	13
14.3	Solute residue	13
	Bibliography	14

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 18116 was prepared by Technical Committee ISO/TC 201, *Surface chemical analysis*, Subcommittee SC 2, *General procedures*.

Introduction

This International Standard is intended to assist analysts in the handling, mounting and treatment of specimens submitted for surface chemical analysis. Although primarily prepared for the surface-analysis techniques of Auger electron spectroscopy (AES), X-ray photoelectron spectroscopy (XPS) and secondary-ion mass spectrometry (SIMS), the methods described in this International Standard will also be applicable to many other surface-sensitive analytical techniques such as ion-scattering spectrometry, low-energy electron diffraction and electron energy-loss spectroscopy, where specimen handling can influence surface-sensitive measurements. AES, XPS and SIMS are sensitive to surface layers that are typically a few nanometres in thickness. Such thin layers may be subject to severe perturbations caused by specimen handling or surface treatments that may be necessary prior to introduction into the analytical chamber.

Proper preparation and mounting of specimens is particularly critical for surface chemical analysis. Improper preparation may result in the alteration of the surface composition and in unreliable analyses. Specimens have to be handled carefully so that the introduction of spurious contaminants is avoided or minimized. The goal is to preserve the state of the surface during preparation and mounting so that the analysis remains representative of the original specimen. This International Standard describes methods that the surface analyst may need to use in order to minimize the effects of specimen preparation when using any surface-sensitive analytical technique. This International Standard also describes methods to mount specimens in order to ensure that the desired analytical information is not compromised.