AS ISO 18116—2006
ISO 18116:2005

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Australian Standard®

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

This Australian Standard® was prepared by Committee CH-016, Spectroscopy. It was approved on behalf of the Council of Standards Australia on 20 September 2006.
This Standard was published on 20 October 2006.

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- Australian Institute of Physics
- CSIRO Energy Technology
- Department of Defence (Australia)
- Department of Natural Resources and Mines Qld
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- Queensland Health Scientific Services

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- Curtin University of Technology
- La Trobe University
- University of Newcastle
- The University of New South Wales
- The University of Queensland
- University of South Australia

This Standard was issued in draft form for comment as DR 06410.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through public comment period.

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

First published as AS ISO 18116—2006.

Published by Standards Australia, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 0 7337 7786 4

PREFACE

This Standard was prepared by the Standards Australia Committee CH-016, Spectroscopy. This Standard is identical with, and has been reproduced from, ISO 18116:2005, *Surface chemical analysis—Guidelines for preparation and mounting of specimens for analysis*.

The objective of this Standard is to provide guidance on methods of mounting and surface treatment for a specimen about to undergo surface chemical analysis.

As this Standard is reproduced from an International Standard, the following applies:

(a) Its number appears on the cover and title page while the International Standard number appears only on the cover.

(b) In the source text 'this International Standard' should read 'this Australian Standard'.

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References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard ISO		*Australian Standard* AS ISO	
18115	Surface chemical analysis—Vocabulary	18115	Surface chemical analysis—Vocabulary

CONTENTS

Page

Page

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.

NOTES

AUSTRALIAN STANDARD

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

1 Scope

This International Standard gives guidance on methods of mounting and surface treatment for a specimen about to undergo surface chemical analysis. It is intended for the analyst as an aid in understanding the specialized specimen-handling conditions required for analyses by techniques such as Auger electron spectroscopy, secondary-ion mass spectrometry, and X-ray photoelectron spectroscopy.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 18115, *Surface chemical analysis — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 18115 apply.

4 Symbols and abbreviated terms

AES Auger electron spectroscopy

SIMS secondary-ion mass spectrometry

XPS X-ray photoelectron spectroscopy

5 General requirements

General information on specimen handling is available in two books[1],[2]. The degree of cleanliness required by surface-sensitive analytical techniques is much higher than for many other forms of analysis. Specimens and mounts must never be in contact with the bare hand. Handling of the surface to be analysed should be eliminated or minimized whenever possible. Fingerprints contain mobile species that may contaminate the surface of interest. Hand creams, skin oils and other skin materials are not suitable for high vacuum.

Although the handling methods for AES, XPS, and SIMS are basically similar, there are some differences. In general, preparation of specimens for AES and SIMS requires more attention because of potential problems with electron or ion beam damage or charging, or both. This International Standard will note when specimen preparation is significantly different among the three techniques.