

---

---

**Surface chemical analysis — X-ray  
photoelectron spectroscopy —  
Guidelines for analysis**

*Analyse chimique des surfaces — Spectroscopie de photoélectrons par  
rayons X — Lignes directrices pour l'analyse*



**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

This document is a preview generated by EVS



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2010

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

Foreword .....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references .....	1
3 Terms and definitions .....	1
4 Symbols and abbreviations .....	1
5 Overview of sample analysis .....	2
6 Specimen characterization .....	4
6.1 General .....	4
6.2 Specimen forms .....	4
6.3 Material types .....	6
6.4 Handling and mounting of specimens .....	7
6.5 Specimen treatments .....	7
7 Instrument characterization <sup>[8]</sup> .....	7
7.1 General .....	7
7.2 Instrument checks .....	8
7.3 Instrument calibration.....	8
7.4 Instrument set-up .....	14
8 The wide-scan spectrum.....	15
8.1 Data acquisition .....	15
8.2 Data analysis.....	16
9 The narrow scan .....	18
9.1 General .....	18
9.2 Data acquisition .....	18
9.3 Data analysis.....	18
10 Test report.....	22
Bibliography.....	24

## 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 10810 was prepared by Technical Committee ISO/TC 201, *Surface chemical analysis*, Subcommittee SC 7, *X-ray photoelectron spectroscopy*.

## Introduction

X-ray photoelectron spectroscopy (XPS) is used extensively for the surface analysis of materials. Elements in the sample (with the exception of hydrogen and helium) are identified from comparisons of the measured binding energies of their core levels with tabulations of those energies for the different elements. Their chemical states may be determined from shifts in peak positions and other parameters compared with the data for that element in its pure elemental state. Information on the quantities of such elements can be derived from the measured intensities of photoelectron peaks. Calculation of the quantities of the constituent chemical species present in the surface layer studied may then be made using formulae and relative-sensitivity factors provided by the spectrometer manufacturer or locally measured relative-sensitivity factors and appropriate software.

This guidance document is intended to aid the operator of X-ray photoelectron spectrometers to obtain efficient, meaningful analyses from typical samples.

This document is a preview generated by EVS

# Surface chemical analysis — X-ray photoelectron spectroscopy — Guidelines for analysis

## 1 Scope

This International Standard is intended to aid the operators of X-ray photoelectron spectrometers in their analysis of typical samples. It takes the operator through the analysis from the handling of the sample and the calibration and setting-up of the spectrometer to the acquisition of wide and narrow scans and also gives advice on quantification and on preparation of the final report.

## 2 Normative references

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

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO 18115-1, *Surface chemical analysis — Vocabulary — Part 1: General terms and terms used in spectroscopy*

## 3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 18115-1 apply.

## 4 Symbols and abbreviations

AES	Auger electron spectroscopy
ARXPS	angle-resolved X-ray photoelectron spectroscopy
CCQM	consultative committee for amount of substance
CRM	certified reference material
EAL	effective attenuation length
FAT	fixed analyser transmission
FRR	fixed retard ratio
FWHM	full width at half maximum
IERF	intensity/energy response function
NIST	National Institute of Standards and Technology
NPL	National Physical Laboratory
RM	reference material
RSD	residual standard deviation
S/N	signal-to-noise ratio