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Australian Standard®

Surface chemical analysis—Augur electron spectroscopy and X-ray photoelectron spectroscopy—Determination of lateral resolution, analysis area and sample area viewed by the analyser

STANDARDS
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- Curtin University of Technology
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PREFACE

This Standard was prepared by the Standards Australia Committee CH-016, Spectroscopy. This Standard is identical with, and has been reproduced from ISO/TR 19319:2003, *Surface chemical analysis—Auger electron spectroscopy and X-ray photoelectron spectroscopy—Determination of lateral resolution, analysis area and sample area viewed by the analyser*.

The objective of this Standard is to ensure that the information for measuring lateral analysis, the analysis area and the sample area viewed by the analyser in Auger electron spectroscopy and X-ray photoelectron spectroscopy is properly achieved.

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 Technical Report' should read 'this Australian Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

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

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

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INTRODUCTION

This Technical Report is intended to be used as follows:

a) To provide guidance on the determination of lateral resolution in Auger electron spectroscopy and X-ray photoelectron spectroscopy where measurements are made of Auger electron or X-ray photoelectron peak intensities as a function of position on a sample surface.

b) To provide guidance on the determination of analysis area in similar applications of Auger electron spectroscopy and X-ray photoelectron spectroscopy.

c) To provide guidance on the determination of sample area viewed by the analyser in applications of Auger electron spectroscopy and X-ray photoelectron spectroscopy.

d) To serve as a basis for the development of International Standards for measurements of lateral resolution, analysis area, and sample area viewed by the analyser in Auger electron spectroscopy and X-ray photoelectron spectroscopy.

AUSTRALIAN STANDARD

Surface chemical analysis — Auger electron spectroscopy and X-ray photoelectron spectroscopy — Determination of lateral resolution, analysis area, and sample area viewed by the analyser

1 Scope

This Technical Report provides information for measuring (1) the lateral resolution, (2) the analysis area, and (3) the sample area viewed by the analyser in Auger electron spectroscopy and X-ray photoelectron spectroscopy.

2 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 18115 [1] apply. The definitions of “analysis area <sample>” and “lateral resolution” from ISO 18115 are given for convenience here. A definition of “sample area viewed by the analyser” is proposed. This definition is similar to the definition of “analysis area <spectrometer>” in ISO 18115. The term “sample area viewed by the analyser” is preferred in this Technical Report to distinguish this area from the corresponding area when the sample is set in a plane at right angles to the spectrometer axis.

2.1
analysis area
<sample> two-dimensional region of a sample surface measured in the plane of that surface from which the entire analytical signal or a specified percentage of that signal is detected

2.2
resolution, lateral
distance measured either in the plane of the sample surface or in a plane at right angles to the axis of the image-forming optics over which changes in composition can be separately established with confidence

NOTE 1 The choice of plane should be stated.

NOTE 2 In practice, the lateral resolution may be realised as either (i) the FWHM of the intensity distribution from a very small emitting point on the sample or (ii) the distance between the 12% and 88% intensity points in a line scan across a part of the sample containing a well-defined step function for the signal relating to the property being resolved. These two values are equivalent for a Gaussian intensity distribution. For other distributions, other parameters may be more appropriately chosen. Often, for a step function, the distance between the 20% and 80% intensity points or the 16% and 84% intensity points in the line scan are used. The latter pair gives the two sigma width for a Gaussian resolution function.

2.3
sample area viewed by the analyser
two-dimensional region of a sample surface measured in the plane of that surface from which the analyser can collect an analytical signal from the sample or a specified percentage of that signal